

# Exploring Lexical Lacunae in the Scientific Translation of Theoretical Physics Books: An English-Kurdish Case-Study

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**Abstract**— this research paper explores lexical lacunae at the word level at the context of English-Kurdish scientific translation. First, the paper briefly describes the development of scientific translation through space and time, and then it demonstrates the status of English and Kurdish as the language of natural sciences. Despite its significance, scientific translation has received little attention in the realm of Translation Studies, and none of the mainstream theories of translation is associated with scientific translation. Thus, this paper assumes that different translation procedures were opted for in overcoming the lexical lacunae in the context of English-Kurdish scientific translation. This paper scrutinises the English-Kurdish translation in the field of theoretical physics, an area which has hitherto left untouched. It explores a set of five theoretical physics books and their translated Kurdish versions, which altogether constitutes a corpus of circa 520,000 words. The study discloses that triplets, borrowing, expansion and omission procedures are employed to deal with lexical lacuna in the context of English-Kurdish scientific translation. It further reveals that LSP specialists were moderately prosperous in transmitting the full lexical contents of the ST.

**Index Terms**— Scientific Translation, Lacunicon, Lexical Lacunae, Translation Procedures.

## I. INTRODUCTION

A comparison between two languages, English and Kurdish in the current case, allows determining both similarities and differences, the latter is most discernible in the case of linguistic lacunae. Lacunae might prohibit comprehension of the target text if not properly treated. Vinay and Darbelnet (1995, p. 66) state that “lacuna exists because one language has not gone as far as the other in the exploration of reality”.

Hatim and Munday (2004, p. 149) further explain that translators may notice lacunae or gaps in the target language which must be filled in by corresponding elements.

Therefore, apart from the subject-matter difficulty, lexical lacunae at the word level can be considered as one of the vivid manifestations of various translation difficulties arise in the process of scientific translation.

The area which deals with the classification and the analysis of lacunae is called lacunicon or lacunology (cf. Anokhina, 2013, p. 171). Lexical lacunae at the word level are a common type of lacuna which scientific translators face during the process of scientific translation. Furthermore, the translators usually employ various translation procedures in eliminating this sort of lacunae. The study, therefore, aims to demonstrate the multi-layered nature of lexical lacunae at the word level alongside the translation procedures that were employed in overcoming them.

The outcomes of the current study are based on the Kurdish translation of English authentic textual data in a set of five books in the field of theoretical physics. The data constitutes a corpus of 520,000 words. It is worth mentioning that translation difficulty is not a fixed notion, as it is bound to various factors such as the aim, the target reader and the translator’s competence. Based on the corpus analysis, however, one can identify certain lexical phenomena that seem to have posed translation difficulties and have required translators to employ various translation procedures.

## II. LITERATURE REVIEW

There is a consensus among scholars that scientific translation has received inadequate attention thus far in the field of Translation Studies (Olohan, 2007; Byrne, 2012; Aixela, 2004). Moreover, the literature of Translation Studies is rich with systematic analysis of literary, journalistic, and audio-visual translation. It is quite difficult, nonetheless, to find a qualitative analysis of the translation of theoretical physics books. Certain academic endeavours focused on different aspects of scientific translation. For instance, Argeg (2015) examined the translation of medical terms from English into Arabic. Alshunnag (2016) investigated translating conceptual metaphors in popular biomedical texts from English into Arabic. Furthermore, none of the existing works on lacuna focused on scientific translation. For example, Szerszunowicz (2015) probed linguistic and referential lacunae between English and Polish so

as to develop learners' dictionary skills. In addition, Rasul (2016) explored linguistic and cultural lacunae in journalistic translation between English and Kurdish.

A review of the existing literature can demonstrate that works on the scientific translation focus on medicine, biology and popular scientific articles. Moreover, works on lacunae mainly focus on journalistic and lexicographic aspects. Within the current literature, however, no single study exists which accounts for lacunae in the translation of theoretical physics books. Thus, probing lacunae in the translation of theoretical physics books, in general, and within the context of Sorani Kurdish, in particular, is an unmet gap which requires systematic analysis.

### III. DATA COLLECTION AND METHODOLOGY

This paper surveys the translation of five theoretical physics books alongside their Kurdish translations. The data was basically collected for the purpose of the researcher's M.A. thesis. This study aims to identify the translation procedures employed by Sorani Kurdish physicists in overcoming lexical lacunae at the word level in the context of English-Kurdish scientific translation of theoretical physics books. The source texts included in the present study comprises five theoretical physics books, which include: *What is life? The Physical Aspect of the Living Cell*, *The Universe in a Nutshell*, *Nothing: A Very Short Introduction*, *A Briefer History of Time*, and *Brief Answers to the Big Questions*. The source texts are from various publication agencies including Cambridge University Press, Oxford University Press, and Bantam Press. The target texts, however, are from a single publication agency (i.e., Xazalrus).

A qualitative, translation-oriented analysis has been adopted. The analysis involves a thorough examination of ST-TT pairs at the word level in order to identify the translation procedures which were opted for by the Sorani Kurdish physicists while translating theoretical physics books.

### IV. SCIENTIFIC TRANSLATION:

#### A BRIEF DIACHRONIC AND SYNCHRONIC OVERVIEW

Insights into the history of translation have demonstrated that scientific translation has always played an instrumental role in the process of the dissemination of knowledge (Montgomery 2000, Pinchuck 1977; Byrne 2012; Olohan and Salama-Carr 2011; Delisle and Woodsworth 1995). The scientific translation emerged from the needs of humans to acquire science and knowledge. Historically speaking, scientific translation played a tremendous role in the development of science and shaping human civilizations. Science penetrated some civilizations through translation and initiated a scientific revolution. Montgomery (2000, p. 272) explains that in a number of major cultures, such as India, China, and Japan science, in fact, began as translation. Regarding the significance of translation for the transformation and proliferation of scientific knowledge, the Italian Renaissance philosopher Giordano Bruno states that

“[f]rom translation, all science has its offspring” (cited in Salama-Carr et al., 2012, p. 95).

Diachronically speaking, around the period which is called the Islamic Golden Age, the role of the Kurds in today's northern Iraq in translating scientific works from other languages into their language has not been investigated before. Anecdotal evidences, however, suggest that during the Islamic Golden Age, Kurdish translators in Southern Kurdistan (i.e., today's Iraqi Kurdistan) had not translated any scientific text from other languages. While it is uncertain why Kurdish translators in southern Kurdistan had such performance regarding scientific translation, it is likely that the diachronic dominance of Arabic language seems to have played a central role. Kozad (2019), the head of the Archaeology department at the University of Sulaimani, argued that it is futile to search for a scientific translation in the records of the Kurdish ancient history. He states that “historically, texts, including scientific texts, were mainly translated into Arabic, and this was due to the dominance of the Arabic language as the lingua franca of general transactions and science”. This remark clearly implies that the Sorani Kurdish language was seen as inferior to the Arabic language in the southern Kurdistan.

Probably, one of the most vivid and cited instances of the circulation of knowledge is the one that occurred through the translation of scientific and philosophical works of ancient Greece into the Muslim world. The Greco-Arabic translation movement with all its social, political and historical implications, can never be repeated in history (cf. Saliba, 1994). This period was marked by rich activities and numerous cross-cultural communications through translation occurred at that time. The themes included rich philosophical and scientific transactions. The Arabic science was built on earlier scientific discoveries and achievements, especially those of Greek. People have always wanted to acquire more knowledge about the universe and how it interacts and operates. Therefore, the Muslim scholars chose the top astronomical and physics discourses to be translated, these include Ptolemy's *Mathematica Syntaxis* ‘which is known primarily by its Arabic name, *Almagist*, meaning the greatest’, Aristotle's *Physics* and Euclid's *Elements* (Gingerich, 1986, p. 76).

The translation of the aforementioned books had a tremendous intellectual impact on the Islamic world, they seem to have contributed to the Islamic Golden Age (cf. Al-Khalili, 2011; Saliba, 2011). Anecdotal evidence suggests that in the past, none of the abovementioned books has been translated into Kurdish. Lacking access to such Physical and astronomical texts had a tremendous negative influence on the Kurdish culture, as such translating such books could have initiated an era of scientific translation and revolution in Kurdistan as they did in the other parts of the Islamic world.

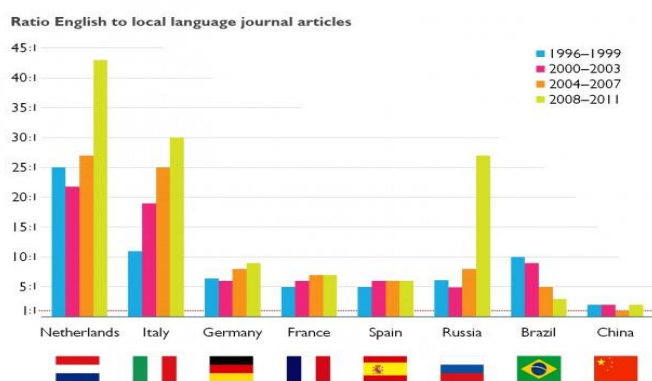
Synchronically speaking and the modern era, due to globalization, constant flow of scientific theories and discoveries, and rapid exchange of knowledge cross-culturally, scientific translation has a pivotal role to play in enhancing societies and even in the progression of science itself. Due to its significance, scientific translation occupies the largest volumes of the translations produced in the translation industry

in the world. Krein-kühle (2003, p. 12) states that “today, the domain of science and technology itself accounts for the lion’s share of total translation work”. Scientific translation has facilitated some of the most significant scientific advances. As our scientific invention, theories and discoveries are increasing, so too the potentials of that science to be translated. Every scientific invention and advances are accompanied at almost every step by translation (Byrne, 2012, p. 1). According to Wilss (1998, p. 83) in a developed country like Germany, it has been estimated that scientific translation accounts for 90% of total volumes of translation (cited in Krein-kühle, 2003, p. 12).

Likewise, scientific translation is gaining increasing importance in the Iraqi Kurdistan Region. Only in the course of the five years, nearly 20 books on theoretical physics and cosmology have been translated by Xazalrus, which is a well-known publication agency in Sulaymaniyah city in the Iraqi Kurdistan Region. This is a clear indication that the synchronic significance of scientific translation is better perceived than its diachronic counterpart within the context of Kurdish culture.

#### V. THE LANGUAGE OF NATURAL SCIENCES: THE STATUS OF ENGLISH AND KURDISH LANGUAGES

It is an established fact that the English language, not for its intrinsic virtue but for the evidence-backed data, is the language of natural sciences. The domain of natural sciences includes Physics, Biology, and Chemistry. English language is a genuine tool which natural scientists use to establish their viewpoints, formulate theories and share their ideas with other scientists and the wider range of audience. Plenty of evidence supports the concept that English is the most widely used language in the field of natural sciences. Ammon (2001, p. 1) asserts that English is the dominant language of natural science. Moreover, Hamel (2007, p.53) maintain that over 90% of the articles in natural science are written in English. For further illustration, consider the figure below which elucidates the share of languages used in natural scientific publications:



The ratio of the journal articles published in English by researchers in eight different countries from 1996 to 2011 (Source: SCOPUS, adopted in Weijen:2012)

The key scientist who is credited to the birth of scientific English was English naturalist Sir Issac Newton when he wrote

his Treatise on Opticks (Halliday, 2004, p. 145). The language used in scientific English texts is distinguished from literary languages and other types of language. One of the eccentric features of English scientific texts is the pervasiveness of specialised lexicon. A prominent feature of the specialised lexicon encompasses the absence of ambiguity (Béjoint, 1988, p. 356). While fictitious and literary writings utilise lexical ambiguity as a valuable rhetorical tool, scientific writings have a low tolerance towards such ambiguity. This is to avoid misunderstanding or misinterpretation.

In addition, another prominent feature of English scientific lexicon is its heavy reliance on nominalization, namely, the substitution of a verb or an adjective or other parts of speech into a noun. Nominalization can be defined as an integral feature of scientific discourse. This methodology of writing has begun with Sir Issac Newton in the 17th century (Banks, 2005, p. 347). Scientists still continue this practice today (Milne, 2011, p. 160). The first noticeable use of nominalization by Issac Newton was in his early work Opticks (written 1657-1658) which was published in 1704. To illustrate nominalization in Newton’s Opticks, an example will be provided. Newton (1704, p. 4) states “[T]he Sines of Incidence, Reflexion, and Refraction, are the Sines of the Angles of Incidence, Reflexion, and Refraction”.

As can be observed, Newton’s quotation is heavily nominalized. It is composed of a massive cluster of nominals. According to Halliday (2004, p. 147) by nominalization in his Opticks, Newton achieved a significant discursal effect which is packaging a range of complex phenomena and concepts and expressing them in a single entity. Through nominalization, Newton appears to have achieved what is currently called concision, which is currently a prerequisite for any scientific text. Concision implies the replacement of long expressions and phrases by shorter ones or even a single word (Giba, 2014, p. 81). Lengthy and long sentences and expressions have the potential to divert the readers and prevent them from concentrating on the main point. In scientific discourse, shorter alternatives help to give a clear message. It is worth mentioning that in the corpus of the current study, all the aforementioned traits can be easily detected, both in the English texts and their translated Kurdish versions.

The hegemony of the English language in the field of natural sciences is vivid. English has already reduced or eliminated the status of other languages as the lingua franca of science, more particularly the natural sciences. Unfortunately, the status and systematic analysis of the Kurdish language in the fields of natural sciences has hitherto left untouched. The language of science has not been developed in the Kurdish context, and several reasons seem to contribute to this. Shatawi and Awe (2018, p. 7) state that “the division of Kurdistan, the lack of academia and Kurdish dictionaries are parts of the obstacles of the development of scientific Kurdish”. They further elaborate that the Kurdish intellectuals and authorities pay more attention to learning foreign languages rather than strengthening and developing the scientific Kurdish language (ibid).

## VI. LACUNAE AT LEXICAL ITEM LEVEL

Translation is a way of bringing two cultures together, each marked with divergence in its linguistic system. Hence, this contact necessarily involves the integration of the source language elements into the target language linguistic system. Nevertheless, certain elements in the SL are absent in the TL, and the linguistic expression for them are lacunae (Vinay and Darbelnet, 1958), gaps (Rogers, 2015), lacunarity (Anokina 2013, Szerszunowics, 2015), or voids (Shuttleworth, 2014). Lexical lacuna is a subtype of linguistic lacunicon (Anokhina, 2013, p. 171). The patterns of lexical lacunae at the word level exhibited during the data analysis of this study encompasses (1) lacuna in scientific eponyms, (2) lacuna in the scientific lexicon and (3) lacuna in scientific reduced lexical forms.

### 1. Lacuna in Scientific Eponym

Eponym is a long-standing tradition in Physics which involves honouring a prominent physicist who played a central role in discovering a particular phenomenon in nature. According to Jones, Eponyms are words derived from a person's name (2009, p. 67). The field of Physics reveals a genuine wealth of eponym terms (Popescu, 2009, p. 117). According to the corpus analysis of the current study, the use of scientific eponyms is very common in the English for Specific Purpose in the context of theoretical physics. As far as Sorani Kurdish is concerned, however, scientific eponyms do not seem to be prevalent and they appear to have been directly derived from English. This indicates that Sorani Kurdish has not been developed in terms of eponyms.

Furthermore, the systematic analysis of Kurdish Physics eponyms is still lacking in the literature, therefore the current insight on the translation of Physics eponyms is solely based on the corpus analysis of the current study. Although it may seem that translators employed a combination of borrowing and transliteration to render a particular eponym. However, the translation also involves a shift in the word order in the Sorani Kurdish. This procedure is called triplets, to use Newmark's terminology. Triplets involve the combination of three translation procedures to solve a single translation problem (Newmark, 1988, p. 91). For example, Casimir effect is translated as کاربهری کازیمیر (BT: effect of Casimir). In other words, the eponym is half translated (the word effect) and half transliterated (the noun Casimir), and it also involved a shift in the word order, which means the English and the Kurdish eponyms have the same semantic value but their word order is different. Likewise, the expressions Michelson-Morley experiment and its Kurdish translation تاقیکردنه‌وه‌ی مایکلسن-مورلی (BT: experiment of Michelson-Morley), Planck's constant and its Kurdish translation نه‌گۆری پلانک (BT: constant of Planck), Grassmann dimension and its Kurdish translation ڕه‌ه‌مندی گراسمان (BT: dimension of Grassmann) can be examples of this type of lacuna.

### 2. Lacuna in Scientific Lexicon

Translators encounter lacunae in the scientific lexicon when the target language lacks a word which exists in a lexicalised form in the source language. Sternina and Makhonina (2009, p. 66) define the concept as "the absence of a word in one language and its presence in another". Translators must be aware of the fact that there are particular words in the source language which do not have a match in the target language (Vinay and Darbelnet, 1995, p. 65). Since the English language is the language of natural sciences (see section III), then it is rich with the scientific lexicon. Sorani Kurdish, nevertheless, is not as rich as English in terms of the scientific lexicon. As a result, it presents a translation problem. As far as the data analysis of the current study is concerned, the following translation procedures were employed to eliminate lacuna in the scientific lexicon:

**A. Borrowing:** it is a common translation procedure which translators consciously employ to overcome lacuna. In scientific translation, this procedure is widely used in translating scientific lexicon between English and Sorani Kurdish. Due to the rapid expansion of scientific theories in the English language and the lack of Kurdish academic centres to keep pace with these theories and concepts, scientific translators commonly opt for borrowing procedure to fill in this lacuna. Vinay and Darbelnet (1995, p. 31) assert that to overcome a lacuna, borrowing is usually the easiest method. Consider the following instance from *What is Life? The Physical Aspect of the Living Cell* (Schrödinger, 1967, p. 5)

#### Example 1:

-In Physics we have dealt hitherto only with periodic crystals.

- تا ئێستا له‌ فیزیادا ته‌نیا له‌ گه‌ڵ کریستالی خولی مامه‌له‌مان کردوو.

[So far in Physics, we have dealt only with periodic crystals]

The words 'physics' and 'crystal' are scientific words. The former is a branch of natural sciences which deals with the universe, matter, and energy. The latter, however, is about the shapes and patterns which have symmetry in the universe. In the TL, the two words are borrowed and the reason probably refers to their non-lexicalisation in Sorani Kurdish.

**B. Omission:** it can be defined as a translation procedure whereby meaningful lexical elements of the ST are deleted or dropped out. There is not an existing study which specifically focuses on omission in scientific translation. Nonetheless, from observation, one can conclude that deletion seems to be a risky procedure in the majority of cases in the context of scientific translation, as it can lead to information and translation loss. Dickins et al. (2002, p. 23) disclose that "the most obvious form of translation loss is when something which occurs in the ST is simply omitted from the TT". Consider the following example

from Nothing: A Very Short Introduction (Close, 2009, p. 87):

**Example 2:**

-Detectors at laboratories thousands of kilometers apart are being linked electronically to make a coherent large-scale experiment code-named LIGO for 'laser interferometer gravity-wave observatory'.

-ئامێره تاییهتەکانی چەند ئەزموونگەیهک له ڕێگەی پەیوەندی ئەلهکترۆنییهوه بهیهکهوه بهستراونهتهوه بۆ ئەوهی بتوانرێت تاقیکردنهوهی گهوره ڕێک بخزێت بۆ ئەم مهههسته. ئەو تاقیکردنهوه گهستهیه به ناوی کورتکراوهی (لیگۆ) ناسراوه.

*[The special equipment of some laboratories is electronically linked together so as to prepare big experimentation for this purpose. This general experiment is abbreviated as LIGO]*

It can be observed that each of laser, interferometry, gravity-wave, and observatory have been omitted in the TT. Laser Interferometry Gravity-Wave Observatory is the world's biggest gravity-wave detector. Laser Interferometry Gravity-Wave Observatory detectors use laser interferometry to measure distortions in the fabric of space-time occurring between stationary, hanging masses caused by passing gravitational waves, it was completed in 1999 (LIGO, 2018). It can be noted that the history of the observatory and the words are new. Perhaps, due to the neologism of the words and the concept and their non-lexicalisation in Sorani Kurdish, the translator resorted to omission in this context.

**C. Expansion:** this occurs when the target text uses more words to re-express an idea or a source text word. Expansion is an increase of the amount of text that is used in the target language to express the same semantic content as compared to the parallel segment in the source text (Delisle et al. as cited in Kruger, 2015, p. 238). In Vinay and Darbelnet's categorization, the equivalence of expansion would be amplification, which is "the translation technique whereby a target language unit requires more words than the source language to express the same idea (Vinay and Darbelnet, 1995, p. 339). Consider the following example from Brief Answers to the Big Questions (Hawking, 2018, p. 170):

**Example 3:**

during which life might have appeared, either spontaneously or through panspermia.

لهو ماوهدا ژيان لهوانهیه بهشیوهی خۆبهخۆ یان به ڕێگهی توخمهژ یانیه گهردوونیهکان دهركهوتییت.

The word 'panspermia' is a scientific word. Panspermia is a hypothesis on the origin of life on the planet earth, and it could also be applied to anywhere else in the universe. According to Grinin et. al., the basic idea is that the organic molecules are in space, and primitive life forms such as bacteria and microorganisms attached themselves to particles of matter and

eventually land on a planet which can sustain that life form (2017, p. 33). The word has been rendered into Sorani Kurdish using expansion and this may refer to the fact that it does not have a direct one-to-one correspondence to the ST word.

**3. Reduced Lexical Forms**

According to the data analysis of the current study, the third layer of lexical lacunarity which seems to have posed translation problem is Reduced Lexical Forms (RLFs). While the English language commonly favours the employment of reduced lexical forms in scientific writing, the Sorani Kurdish language does not seem to have an exact equivalence for those forms. Hence, they present a translation problem. According to the corpus analysis of the present study, reduced lexical forms can be manifested in two categories, which are: (1) acronym, and (2) clipped forms.

**1) Acronym:** is a word which is formed from the initial letters of a set of words. According to Stageberg, acronym is the process where a word is formed by the initials of a succession of words (1981, p. 123). Acronyms are pervasively common in scientific writing. Regarding Sorani Kurdish, it does not seem to be as rich as English in terms of the scientific acronym, therefore acronyms present translation problem. Depending on the data analysis, to overcome the lacunarity associated with acronyms, the following translation procedures have been employed:

**A. Borrowing:** it is an effective translation procedure which translators employed to overcome acronym lacunarity. According to the data used in the current study, borrowing is heavily used in the rendition of acronyms, consider the following example from The Universe in a Nutshell (Hawking, 2001, p. 187):

**Example 4:**

-Before the 1980s it was usually assumed that this dark matter was ordinary matter comprised of protons, neutrons, and electrons in some not readily detectable form: perhaps gas clouds, or MACHOs.

پێش ساڵانی ١٩٨٠ به گهستی گهیهانه دهکرا، ئەم مادده تاریکه ماددهی ئاساییه و پینکاتهکهی برتییه له پروتون، نیوترون و ئەلیکترون، بهلام به پوخساریکی نهشیانو-بۆ بیدین وهک ههوری گازی یان (MACHO)کان

*[Before the 1980s, it was generally hypothesised that this dark matter was ordinary matter comprised of proton, neutron and electron, but in an invisible form such as gas cloud or MACHOs]*

The acronym MACHO stands for 'Massive Astrophysical Compact Halo Object'. MACHO can be a candidate for the galactic dark matter (Bergström & Goobar, 2006, p. 90). The abovementioned acronym does not exist in Sorani Kurdish, and the translator resorted for borrowing from English to fill this type of lexical lacunae.

**B. Omission:** this simply indicates dropping put the acronym entirely from the TT. To overcome lacunarity in acronym, translators sometimes opt for omission to eliminate the lacuna. Consider the omission of CERN in the below example:

**Example 5:**

such as those at Fermilab or the European Centre for Nuclear Research (CERN).

یان له ناوهندی توپزینهوهی ناوکی ئەوروپی ...

[or in the European Nuclear Research Centre]

The acronym 'CERN' is derived from the French acronym which stands for 'Conseil Européen pour la Recherche Nucléaire', CERN is one of the largest and most respected centres for scientific research that operates the largest particle physics laboratory in the world (cf. Evans, 2009). The acronym above does not have a lexicalised, one-to-one correspondence in the Kurdish language, to overcome this lacuna, the translator simply omitted the acronym. Although the word 'CERN' has been omitted in the TT, yet this omission in this context does not seem to harm the meaning of the text. According to Baker (2011, p. 42) in some contexts, omitting a word or expression does not harm the meaning.

**2) Clipping:** clipping is common in scientific English writing. For Yule, clipping occurs when a word of more than one syllable is reduced to a shorter form (2010, p. 56). As far as Sorani Kurdish is concerned, it does not seem to have an exact counterpart for the scientific clipped forms, therefore they present translation constraint. To overcome lacunarity in the scientific clipped forms, borrowing seems to be an effective procedure to be employed. Consider the following example from Nothing: A Very Short Introduction (Close, 2009, p. 70):

**Example 6:**

- Common in cosmic rays is a particle called muon.

- یەک لەو گەردیلۆکانەى که وەک (تیشکی گەردوونی) لەناو بەرگهههواى زههیدا پهیدا دهییت، به (میۆن) ناسراوه.

[one of the particles which emerge as a cosmic ray within the atmosphere of the earth is known as (muon)]

In particle physics, muon refers to an unstable subatomic particle. According to Caso, muon is a clipped form of mu-meson (1980, p. 105). The word has been translated into Sorani Kurdish using borrowing because Sorani Kurdish does not have an exact equivalent for this scientific word, and this is due the fact that this word is a newly coined word in English as it is been discovered as a constituent of cosmic-ray particle shower in 1936 by the American physicists Carl D. Anderson and Seth H. Neddermeyer while studying cosmic radiation (cf. Neddermeyer & Anderson, 1937).

CONCLUSION

This research paper investigated the translation of theoretical physics books, the translation products were offered by Kurdish physicists. For the purpose of the current research, a set of five theoretical physics books, alongside their translation in Sorani Kurdish, have been chosen to be examined so as to identify patterns of lexical lacunae at the word level, along with the translation procedures which were opted for to overcome this type of lacunae. Lexical lacunae are translation constraint and they hinder proper ST-TT communication. The results have exhibited that translators face various types of lexical lacunae at the word level such as: lacuna in scientific eponym, lacuna in scientific lexicon and lacuna in scientific reduced lexical forms (i.e., acronym and clipping). Depending on the nature of the lacuna, manifold translation procedures were employed to overcome lexical lacunae, the procedures include triplets, borrowing, expansion, and omission. The Kurdish physicists were partially successful in rendering the full lexical contents of the ST. On one hand, they translated the ST lexical items by triplets, borrowing, and expansion, which means the TT readers were not at the risk of information loss and they received full lexical content of the STs. On the other hand, they omitted some scientific lexical elements. In some cases, this omission has led to significant information loss, while in few cases it did not. Ultimately, the task of a scientific translator is to provide the TT audience with full and accurate contents of the ST. Thus, omitting lexical items can leave the TT readers at the risk of not receiving the full information of the STs.

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