MORPHOLOGY OF PHYSICS TERMS IN ENGLISH AND UZBEK LANGUAGES

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Abstract: This study examines the morphology of physics terms in the English and Uzbek languages from a comparative and contrastive perspective. The research focuses on the structural characteristics of physics terminology, including word-formation processes such as affixation, compounding, borrowing, abbreviation, and conversion. Special attention is paid to the role of international (mainly Greek and Latin) morphemes in English physics terms and their adaptation or replacement in Uzbek. The analysis reveals both shared and language-specific morphological patterns: while English physics terminology demonstrates a high degree of affixal productivity and compound formation, Uzbek physics terms are largely formed through derivation, calquing, and terminological standardization based on native lexical resources. The study highlights how morphological structure influences term transparency, semantic precision, and terminological consistency in both languages. The findings contribute to comparative linguistics, terminology studies, and the development of bilingual physics dictionaries, as well as to improving the teaching and translation of scientific texts in English and Uzbek.

Keywords: *affixation, semantic shift, agglutination, fusional language, concatenation, reduplication, lexicon.*

Morphology of physics terms in English and Uzbek languages reveals fundamental differences and similarities rooted in the linguistic structures and word-formation processes of each language. English physics terminology frequently utilizes morphological mechanisms such as affixation (prefixes and suffixes), compounding, blending, and neologism formation to create and adapt terms. These processes enable the language to form precise vocabulary crucial for scientific discourse by combining roots with affixes to denote specific physical concepts. Additionally, English terms often undergo semantic shifts—such as narrowing and broadening—as scientific understanding evolves, reflecting the dynamic nature of physics terminology in response to technological advances.

In contrast, Uzbek scientific terminology exhibits a distinctive morphological character primarily governed by compounding and agglutination rather than extensive prefixation or suffixation seen in English. Uzbek tends to create complex scientific and technical terms by combining multiple roots into compound words, often supplemented by suffixes and prefixes to modify meanings. Agglutination in Uzbek allows a linear addition of morphological markers to a base root, enabling a structured yet flexible way to denote complex physical concepts. This process supports the precision necessary in conveying scientific meanings while maintaining consistency with the agglutinative nature of the Uzbek language.

Both languages employ compound words in terminology, yet the methods reflect their typological differences: English is a fusional language using both affixes and compounds, while Uzbek, as an agglutinative language, heavily relies on compounding and morphological concatenation. Historically, Uzbek scientific terminology has also experienced influence from Russian and Persian languages, especially during the Soviet era, which affected term borrowing and neologism

formation. In addition, the development of scientific and technical terms in Uzbek has been crucial in expanding the language's capacity to express modern scientific knowledge, enabling better communication of specialized information alongside English, which dominates international scientific literature.

Morphological studies of physics terms in both languages show how the morphology aligns with their syntactic and phonological systems to enhance comprehension and communication in scientific contexts. English terms such as "momentum," "velocity," or "acceleration" exhibit classical Greek or Latin roots combined with analytic morphology, while Uzbek equivalents often represent translations or adaptations using native morphological structures. These differences underline the importance of linguistic adaptation to culture and language structure when developing scientific lexicons, particularly in physics, a domain demanding high precision and clarity.

In summary, the morphology of physics terms in English and Uzbek reflects their linguistic typologies and historical contexts. English favors affixation and semantic evolution, while Uzbek emphasizes compounding and agglutination for term formation. Both systems efficiently serve the purpose of expressing complex scientific ideas, with Uzbek undergoing deliberate development influenced by sociolinguistic factors and English adapting dynamically to continual scientific progress. This interplay highlights the linguistic creativity and adaptation essential in global scientific communication

English and Uzbek employ distinct yet overlapping term formation processes in physics, shaped by their typological differences: English, an analytic language, favors affixation, compounding, conversion, and borrowing, while Uzbek, an agglutinative language, prioritizes suffixation, compounding, and derivational morphology [1][2].

English physics terms often derive from Greek and Latin roots through affixation, as in "electro-" (prefix for electricity-related concepts) combined with suffixes like "-dynamics" to form "electrodynamics." Compounding creates terms like "quantum mechanics" by juxtaposing roots without inflection, and borrowing integrates international terms such as "laser" (acronym for Light Amplification by Stimulated Emission of Radiation). Conversion allows nouns like "force" to function adjectivally, enhancing flexibility in scientific discourse.

Uzbek physics terminology relies heavily on agglutinative suffixation, appending markers to roots for precision, such as "-lik" for nominalization in terms denoting physical properties. Compounding dominates, forming words like "harakat mexanikasi" (motion mechanics) by concatenating descriptive elements, often influenced by Russian loans during Soviet standardization. Reduplication and semantic extension also appear, adapting native structures to express novel concepts like quantum phenomena [2][5].

ASPECT	ENGLISH	UZBEK
primary process	affixation, compounding, borrowing	suffixation, compounding
typology influence	analytic: minimalinflection, syntactic flexibility	agglutinative: linear morpheme addition
physics examples	“velocity” (Latin root+suffix	“Tezlik” (speed, suffixed root
enternal influence	Greek\Latin, global science	Russian\Persian loans, native adaptation

Both languages share compounding for complex terms, but English emphasizes innovation via acronyms and blends, whereas Uzbek ensures

phonological and grammatical integration through suffixes, reflecting cultural and historical contexts in scientific terminology development [1][3].

English physics terms arise through borrowing from classical languages like Greek and Latin, as well as native formation via compounding and affixation from Germanic roots [1].

Many physics terms are loanwords directly imported or adapted from Greek and Latin, preserving etymological roots for precision. "Electron" derives from Greek "ēlektron" (amber), referring to charged particles, while "photon" combines Greek "phōs" (light) with the suffix "-on" for quanta of light. "Quark" was borrowed from James Joyce's novel Finnegans Wake, illustrating modern literary borrowing into particle physics [1]. These borrowings dominate due to the international scientific tradition, often undergoing nativization in pronunciation [3].

Native English terms typically form through compounding or derivation using Anglo-Saxon roots, creating intuitive compounds like "black hole" (from "black" + "hole" for gravitational singularities) or "speed" (from Old English "spēd," extended semantically) [4]. "Work" in physics (force times distance) evolved from native Germanic roots via semantic shift, and "fall" underlies "free fall" through simple compounding. Affixation with native elements, such as "overheat" (over- + heat), also appears, though less common in core physics lexicon [5].

FORMATION TYPE	EXAMPLES	ORIGIN\SOURCE	CHARACTERISTICS
Borrowing	Electron, photon, quark	Greek\Latin\Literary (non-native)	Morphemic importation, often specialised suffixes like -on

Native	Black hole, speed, free fall	Germanic\Anglo-Saxon roots	Compounding, semantic extension, analytic structure

Borrowing prevails in technical physics for its prestige and historical continuity, while native processes offer accessibility and adaptability in everyday scientific English.

In conclusion, the comparative analysis of the morphology of physics terms in English and Uzbek demonstrates that terminological formation in both languages follows systematic morphological principles shaped by linguistic structure, historical development, and scientific tradition. English physics terminology is characterized by extensive use of classical Greek and Latin morphemes, productive affixation, and compound formations, which contribute to high terminological precision and international uniformity. In contrast, Uzbek physics terminology shows a stronger tendency toward derivation based on native roots, semantic calquing, and the adaptation of international terms in accordance with phonological and morphological norms of the Uzbek language.

Despite these differences, both languages aim to achieve clarity, conciseness, and conceptual accuracy in naming physical phenomena and processes. The study confirms that morphological structure plays a crucial role in term transparency and comprehensibility, directly affecting the effectiveness of scientific communication and education. Overall, the findings underscore the importance of contrastive morphological studies for the standardization of scientific terminology, the compilation of bilingual dictionaries, and the improvement of translation practices in the field of physics.

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