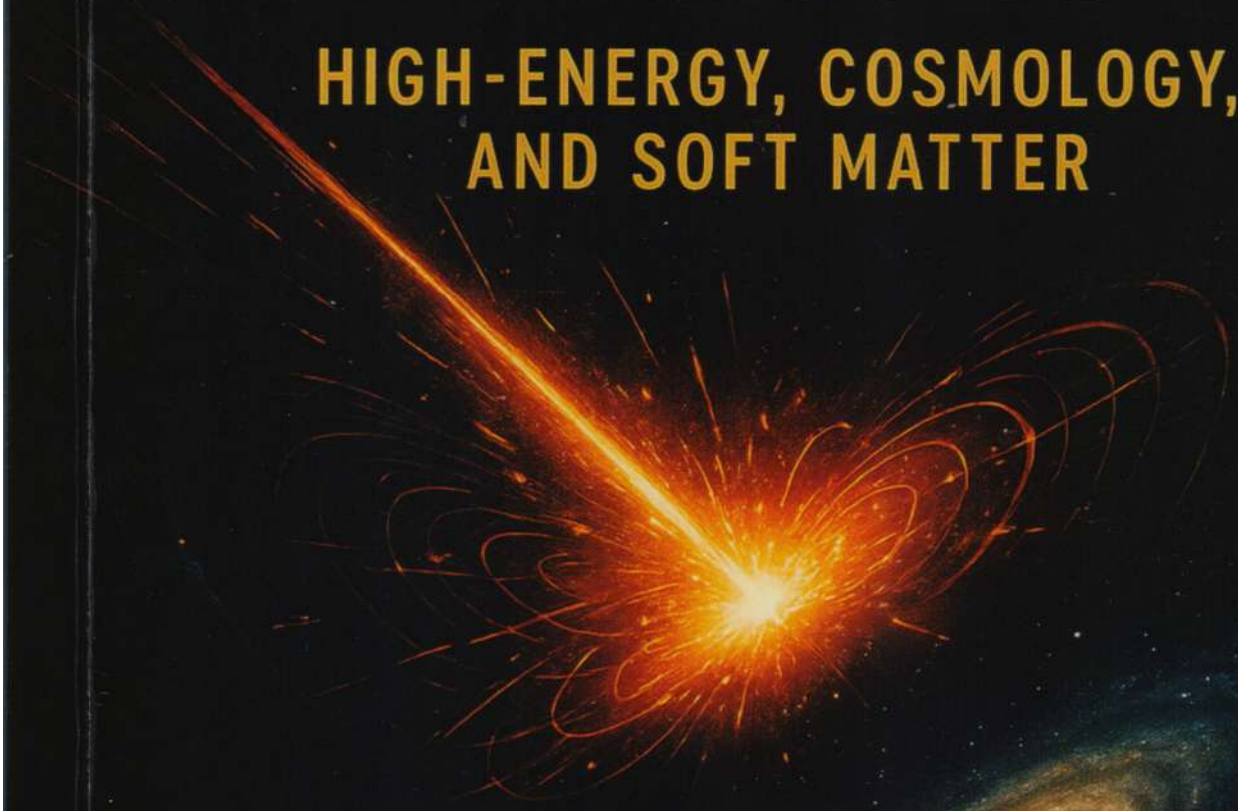
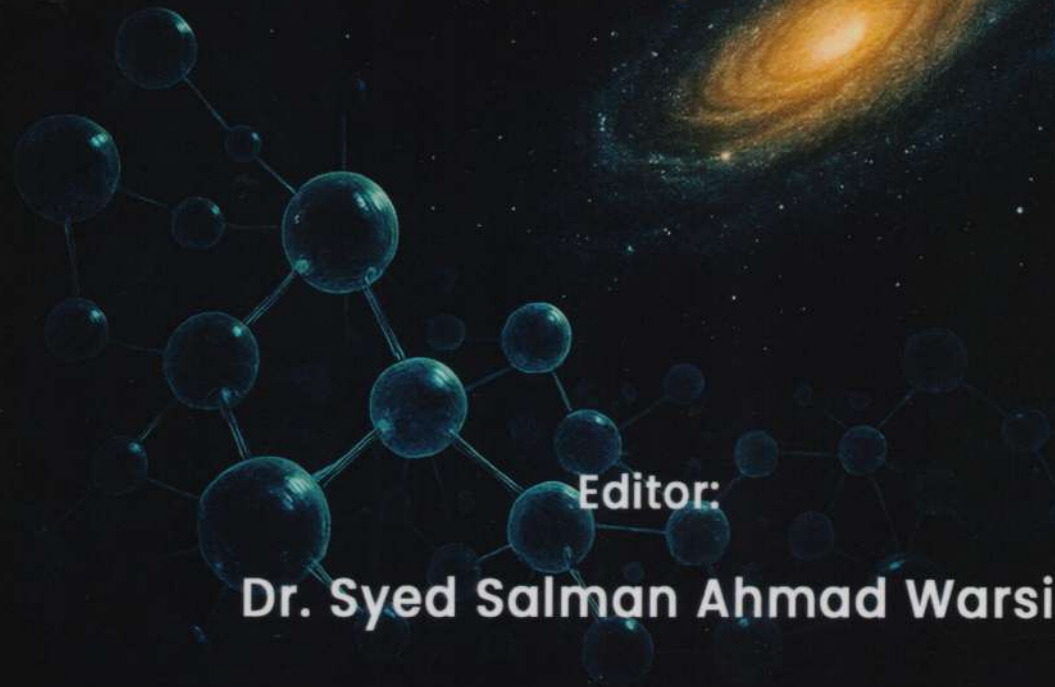
ADVANCES IN CONTEMPORARY PHYSICS

HIGH-ENERGY, COSMOLOGY, AND SOFT MATTER





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High-Energy, Cosmology, and Soft Matter

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VIBRATIONAL DYNAMICS OF ENDOMORPHINE-2

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An essential opioid peptide, endomorphine-2 has a broad range of uses in neurotransmitter release, hormone production, pain perception, and respiratory activity. Wilson and Urey Bradley force field conducted a thorough vibrational analysis utilizing the GF matrix method to comprehend the dynamical behavior of this opioid peptide. The potential energy distribution of different amide modes has been analyzed.

INTRODUCTION:

All of us have an innate reliance on opioids for emotional well-being. Narcotics and internally produced Endomorphine affect the tissues by interaction with a particular membrane receptor protein on nerve cells of human. Endomorphine 1 and Endomorphine 2 both are the opioid peptides of brain that are detected earliest. They have strong selectivity and attraction towards the μ type receptors [1]. Endomorphine-2(Tyr-Pro-Phe-Phe-NH_2) has sequences that are very different from those of typical opioid peptides in mammels, like enkephalins and dynorphins. In our human bodies, endomorphin-2 (EM2) had a strong analgesic impact on the spinal dorsal horn (SDH),which had a great attraction and specificity for the μ opioid receptor [2]. The opioid receptors are member of the G-protein-coupled receptor (GPCR) family, are known to influence how pain is perceived among other biological processes [3, 4].

According to Choi *et al.* (5), EM2's analogue [Phe(p-NH_2)4] had the maximum attraction (IC50=37nm) for μ receptors. Endomorphine-2 can take on different conformations associated with the Tyr-Pro amide linkage's cis/trans rotamers. According to M. Doi *et al*. [6], constrained or flexible constituents added at the Pro position can regulate isomerization. They discovered that the β-turn of leu-enkephaline is comparable to the structure of an endomorphine equivalent [(CHX_2)EM2]. According to In *et al*. [7], the population ratio of EM1 in DMSO solution was 1:3 and for cis/trans rotamers, it was around 1:2.

In *et al.* [7] use molecular modeling calculations and 1H NMR spectroscopy to compare the conformation of μ-selective EM2 having free acid at C terminal in solution of DMSO. They proposed that the development of a certain bioactive conformation requires the presence of the amide group at C terminal, that renders the amino group at N-terminal in a neutral state. The