Contribution ID: **50** Type: **Poster**

Multiphoton-assisted α-tunneling in deformed SHN driven by X-ray field

We develop the Floquet-Volkov formalism for the multiphoton ionization process grounded in a microscopic phenomenological approach that incorporates the Skyrme force model within the Wentzel-Kramers-Brillouin (WKB) approximation to calculate the α-particle's penetration probabilities in the deformed SHN subjected to an intense X-ray laser field. Our findings reveal that such high-intensity electromagnetic (EM) fields significantly alter the tunneling phenomenon followed by the emitted α-particle. The sensitivity of relative enhancement in penetration probabilities (ΔPrel-values) is found to correlate strongly with the effective nuclear charge (Zeff) and the decay energy(Qα). Many empirical formulae relating log10ΔPrel-values with Zeff-values are suggested, offering a predictive handle on laser-induced α-particle's penetration probabilities. In addition, the changes in tunneling probability are shown to inversely influence the α-decay half-lives (ΔTrel). By extending the scope of multiphoton interactions into the nuclear regime, this work provides new perspectives for probing nuclear structure under extreme fields and for exploring controlled modifications of decay lifetimes at the intersection of nuclear and electromagnetic physics.

Authors: BHARMORIA, Shubham; Dr KAUR, Harjeet (Guru Nanak Dev University, Amritsar)

Presenter: BHARMORIA, Shubham