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Alpha decay in intense laser fields[1] XU WANG, JINTAO QI, LIBIN FU, Graduate School of China Academy of Engineering Physics — The past few decades witness rapid advancements in intense laser technologies. The promising under-constructing extreme light infrastructure (ELI) of Europe is designed to reach peak laser intensities of about 10^{24} W/cm^2. The corresponding laser electric field strength is comparable to the nuclear Coulomb field at a radius of about 10 to 100 fm Intense laser fields therefore can influence nuclear processes that are sensitive to the Coulomb potential barrier, such as alpha decay. In this presentation, we will analyze the influence of intense laser fields on the nuclear alpha decay process, and present numerical results with the help of quantitative alpha-nucleus potentials. Our results show that alpha decay can indeed be modified by intense external laser fields to some finite extent. A modification on the alpha particle penetrability (or half-life) of 0.1% is predicted for a laser intensity of 10^{24} W/cm^2 Our study provides a scheme where intense lasers meet nuclear physics. In this scheme, the laser influences nuclear physics through its intensity, instead of photon frequency.

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