

Electron screening effect in nickel

For very low projectile energies, far below the Coulomb barrier, the nuclear reaction rate is very low and sensitive to electronic properties of target materials. In this case the projectile tunnels through a wide potential barrier. However, the electrons which are surrounding the reacting nuclei act as a screening potential, which leads to the incoming projectile seeing an effectively reduced Coulomb barrier. This increases the tunneling probability and enhances the nuclear reaction rates. To investigate the electron screening effect we compared γ -ray yields in different environments (Ni –metal and NiO –insulator) for the proton induced nuclear reactions: Ni-58(p, γ), Ni-60(p, γ) and Ni-64(p,n γ). We used a proton beam with energies between 1.08 MeV and 3.08 MeV accelerated by the 2 MV Tandetron accelerator at Jožef Stefan Institute. We also looked for shifts in resonance energy for reactions Ni-58(p, γ) and Ni-58(p,p' γ).

Primary author: Ms CVETINOVIĆ, Aleksandra (J. Stefan Institute, Jamova cesta 39, 1000 Ljubljana, Slovenia)

Presenter: Ms CVETINOVIĆ, Aleksandra (J. Stefan Institute, Jamova cesta 39, 1000 Ljubljana, Slovenia)