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**Eikonal phenomenology in the analysis of  $\alpha$ -nucleus elastic-scattering data**

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**Abstract**

Working within the framework of the Coulomb-modified Glauber model, we instead of conventionally using the Gaussian approximation to the basic input nucleon-nucleon (NN) amplitude, evaluate it from a three-parameter phenomenological NN phase shift function. At a given projectile energy the parameters of the NN phase shift function are varied to fit the  $\alpha$ -nucleus elastic-scattering data. It is found that once the parameters of the NN phase shift function are fixed, it very nicely reproduces the available elastic  $\alpha$ -scattering data on other nuclei at the same energy. By applying this procedure, a reasonably good account of elastic-scattering data for  $\alpha$ -<sup>40-48</sup>Ca, <sup>58</sup>Ni, <sup>116</sup>Sn and <sup>208</sup>Pb have been achieved in the energy range about 0.2 GeV-1.37 GeV. © 2010 IOP Publishing Ltd.