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Three-body approach to direct nuclear reactions involving weakly bound systems ANTÓNIO C. FONSECA, Centro de Física Nuclear Universidade de Lisboa, Av Prof. Gama Pinto 2, 1649-003 Lisboa, Portugal — The Faddeev type Alt, Grassberger and Sandhas (AGS) equations for transition operators were, in recent years, consistently applied to study direct nuclear reactions using realistic nucleon-nucleus optical potentials together with modern nucleon-nucleon interactions. The equations are solved numerically using momentum-space partial-wave basis. The Coulomb interaction between charged particles is included using a novel implementation of the screening and renormalization method. The AGS equations have been successfully used to study elastic, transfer, and breakup reactions in three-body-like nuclear systems. Examples are deuteron scattering on stable nuclei ^{4}He, ^{10}Be, ^{12}C, ^{14}C, ^{16}O, ^{40}Ca, and ^{58}Ni and proton scattering on weakly bound two-body system such as ^{11}Be, ^{13}C, ^{15}C, and ^{17}O. These calculations allow to evaluate the accuracy of traditional approximate nuclear reaction approaches like the continuum-discretized coupled-channels (CDCC) method but also to test novel dynamical models such as energy dependent and nonlocal optical potentials.

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