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Séminaire de Physique Nucléaire Théorique

Four-body effects in nucleus-nucleus scattering.

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The main goal of the Continuum Discretized Coupled Channel (CDCC) method is to solve the Schrödinger equation for reactions where the projectile presents a cluster structure, and a low dissociation energy. The CDCC method has been introduced forty years ago to describe deuteron induced reactions. Owing to the low binding energy of the deuteron, it was shown that including continuum channels significantly improves the description of d+nucleus elastic cross sections. The simplest variant of CDCC describes scattering of a two-body nucleus with a structureless target, but extensions to three-body projectiles have been performed recently. The projectile continuum is approximated by a finite number of square-integrable states, up to a given truncation energy.

I present here a new development of the CDCC method, which aims at describing reactions where the projectile and the target have a low separation energy. This leads to four-body (or more) calculations.I solve the coupled-channel system by using the R-matrix method on a Lagrange mesh. Applications to ^{11}Be+d and ^{7}Li+d scattering are presented.

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