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Applying the Crystal Model to Different Nuclear Systems

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Abstract : The angular distributions of the nuclear systems under consideration have been analyzed in the framework of the optical model (OM), where the real part was taken in the crystal model form. A crystal model (CM) has been applied to deuteron elastically scattered by ^{6,7}Li and ^{9}Be. A crystal model (CM) + distorted-wave Born approximation (DWBA) + dynamic polarization potential (DPP) potential has been applied to deuteron elastically scattered by ^{6,7}Li and 9Be. Also, a crystal model has been applied to ^{6}Li elastically scattered by ^{16}O and ^{28}Sn in addition to the ^{7}Li+^{7}Li system and the ^{12}C(alpha,^{8}Be) ^{8}Be reaction. The continuum-discretized coupled-channels (CDCC) method has been applied to the ^{7}Li+^{7}Li system and agreement between the crystal model and the continuum-discretized coupled-channels (CDCC) method has been observed. In general, the models succeeded in reproducing the differential cross sections at the full angular range and for all the energies under consideration.

Keywords : optical model (OM), crystal model (CM), distorted-wave born approximation (DWBA), dynamic polarization potential (DPP), the continuum-discretized coupled-channels (CDCC) method, and deuteron elastically scattered by ^{6,7}Li and ^{9}Be

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