On multistep direct emission of one and two nucleons and the more complicated direct processes that follow

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Distinction between small orbital agular momentum transfers of the coherent vibrations, and the large orbital angular momentum transfers of the incoherent particle-hole pairs enables to remove double-counting from the description of pre-equilibrium multistep direct one-particle emission. Distinction between neutrons and protons allows one to account for the different sequences of collisions that contribute to a given multistep direct reaction. Distinction between the bound final states and the unbound ones enables to remove the divergency of the multistep direct cross sections, observed above 40 MeV, and allows one to evaluate the role of more complicated direct processes, namely two-particle emission or one-particle emission followed by damping of another one.

The consequences of these findings are verified in analyses of a representative series of nucleon induced reactions.