

Microscopic Analysis of Elastic Scattering of One-Proton Halo Nucleus ^{17}F on Different Mass Targets

**M.K. Gaidarov¹, K.V. Lukyanov², E.V. Zemlyanaya², V.K. Lukyanov²,
D.N. Kadrev¹, A.N. Antonov¹**

¹Institute for Nuclear Research and Nuclear Energy, Bulgarian Academy of Sciences, Sofia 1784, Bulgaria

²Joint Institute for Nuclear Research, Dubna 141980, Russia

An analysis of cross sections of elastic scattering of ^{17}F on ^{12}C , ^{14}N , ^{58}Ni , and ^{208}Pb nuclei at energy 170 MeV and on ^{208}Pb at various energies is carried out by using the microscopic optical potentials (OPs) [1]. The proton and neutron density distributions of the exotic nucleus ^{17}F are computed in the framework of microscopic models. The real part of the OP is calculated by a corresponding folding procedure accounting for the anti-symmetrization effects, while the imaginary part is obtained on the base of the high-energy approximation [2]. In the hybrid model of the optical potential developed and explored in our previous works [3,4] the only free parameters are the depths of the real and imaginary parts of the OPs obtained by fitting the experimental data. A good agreement of the theoretical results with the available experimental data is achieved pointing out clearly to a peripheral character of the scattering.

References

- [1] M.K. Gaidarov, K.V. Lukyanov, E.V. Zemlyanaya, V.K. Lukyanov, D.N. Kadrev, and A.N. Antonov, *Phys. Part. Nucl.* **54** (2023) 500.
- [2] V.K. Lukyanov, E.V. Zemlyanaya, and K. V. Lukyanov, *Phys. At. Nucl.* **69** (2006) 240; JINR Preprint P4-2004-115, Dubna, 2004.
- [3] K.V. Lukyanov, et al., *Eur. Phys. J. A* **33** (2007) 389.
- [4] V.K. Lukyanov *et al.*, *Phys. Rev. C* **80** (2009) 024609; *Phys. Rev. C* **82** (2010) 024604; *Phys. Rev. C* **88** (2013) 034612; *Phys. Rev. C* **91** (2015) 034606; *Eur. Phys. J. A* **53** (2017) 31; *Phys. Rev. C* **100** (2019) 034602.