Study of low-lying resonant states in ^{16}F using an ^{15}O radioactive ion beam

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A 120 MeV ^{15}O radioactive ion beam with an intensity on target of 4.5×10^4 pps has been developed at the 88-inch cyclotron at the Lawrence Berkeley National Laboratory [1]. This beam has been used to study the level structure of ^{16}F at low energies via the p(^{15}O,p) reaction using the thick target inverse kinematics method [2] on a polyethylene target. The experimental excitation function was analyzed using R-matrix calculations. Significantly improved values for the level widths of the four low-lying states in ^{16}F are reported. The spectroscopic factors are obtained using the experimental level widths and on the basis of the Coulomb shifts of the mirror levels in ^{16}N and ^{16}F. Good agreement with the theoretical spectroscopic factors is also obtained. Fig.1 presents the excitation function for the ^{15}O+p elastic scattering at 180^0 (0^0 in the laboratory system).

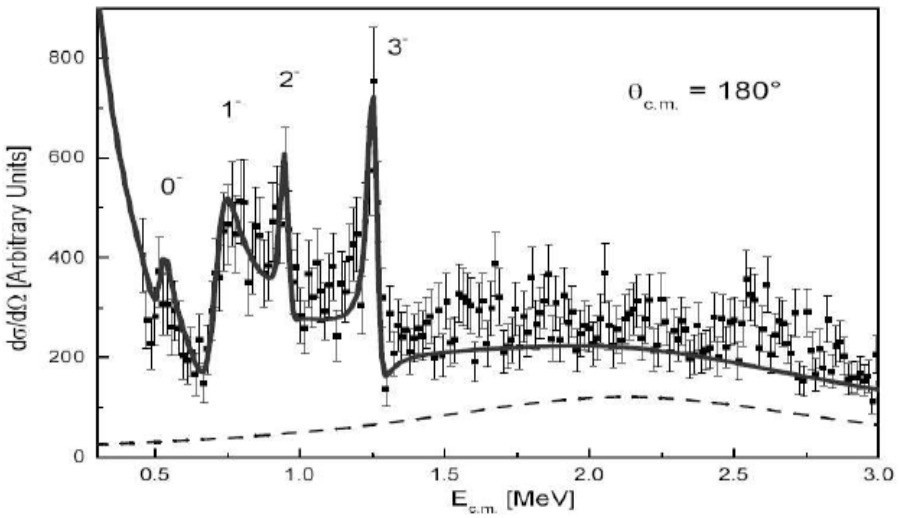

Figure 1. The R-matrix fit for the low-lying states in ^{16}F. The solid line represents the R-matrix calculation added to the background; the background function is shown as a dashed line.

[1] F. Q. Guo *et al.*, Phys. Rev. C **72**, 034312 (2005).
[2] K. P. Artemov *et al.*, Sov. J. Nucl. Phys. **52**, 408 (1990).