Transfer across an isobaric multiplet: (d,p) of ^{17}F and ^{17}O

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We present new results from a study of the $A = 18$ triplet, ^{18}F and ^{18}O, performed using neutron-adding (d,p) reactions in inverse kinematics with the HELIOS solenoidal spectrometer at Argonne National Laboratory. Using radioactive ^{17}F and stable ^{17}O beams, at energies of 9.7 MeV/u and 10.1 MeV/u, respectively, isobaric analogue states in ^{18}F ($N = Z,\ T_z = 0$) and ^{18}O ($N = Z + 2,\ T_z = +1$) have been populated, enabling a direct comparison of $T = 1$ analogue states. In particular, strongly and weakly bound IAS have been studied. The extraction of relative spectroscopic factors allows for the study of the role of single-particle structure in the breaking of the isospin symmetry. The initial states, ^{17}F and ^{17}O, are just one nucleon outside of doubly magic ^{16}O, and the final states of interest represent just a pair of nucleons outside this core. This allows for a detailed comparison with shell-model calculations, which describe the structure of these light systems well. The experimental methodology and the data analysis will be presented.

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