DIQUIS observation of \( n=2 \rightarrow 7 \) He \( 2pmp^1D \) autoionizing resonances.\(^1\) N.L.S. MARTIN, B.A. DEHARAK, U. Kentucky, S.H. SOUTHWORTH, E.P. KANTER, B. KRAESSIG, L. YOUNG, Argonne National Laboratory, R. WEHLITZ, U. Wisconsin — We have applied the technique of DIpole-QUadrupole Interference Spectroscopy (DIQUIS) to make the first observation of an optically forbidden Rydberg series using photoelectron spectroscopy. The He \( 2pmp^1D \) autoionizing levels appear as a series of resonances in the non-dipole \( \gamma \) parameter.\(^2\) The experiments were carried out at the Synchrotron Radiation Center, University of Wisconsin-Madison using an electron spectrometer system, designed and built at Argonne National Laboratory, to efficiently measure nondipole asymmetries in photoelectron angular distributions. We will present measurements of \( \gamma \) for photon energies that cover the \( n = 2 \rightarrow 7 \) resonance region. Fits to the data yield values of level positions, widths, and Fano \( q \) parameters.

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