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Advances in compact proton spectrometers for diagnosing ICF experiments F.H. SEGUIN, N. SINENIAN, M. MANUEL, H.G. RINDERKNECHT, M. ROSENBERG, A. ZYLSTRA, J. FRENJE, C.K. LI, R. PETRASSO, MIT, S. ROBERTS, T.C. SANGSTER, LLE — The compact proton spectrometer (or WRF, for Wedge-Range-Filter proton spectrometer) measures the spectra of protons in the energy range $\sim$ 3 to 20 MeV for diagnosing ICF experiments. It utilizes CR-39 for detecting individual protons and their energies, after they pass through a ranging filter with a continuously varying thickness, and appropriate algorithms for reconstructing the incident spectrum. It has now been in use for a decade at OMEGA, and is currently being used at the NIF, for measuring spectra of primary D^3He protons in D^3He implosions, secondary D^3He protons in DD implosions, and ablator protons in DT implosions. These spectra are used to determine proton yields, shell areal density at shock-bang time and compression-bang time, fuel areal density, and implosion symmetry. During the decade of use there have been significant changes in fabrication and in analysis algorithms. An overview will be given here of the historical development, current analysis methods, and measurement accuracy. This work was supported in part by DOE and LLE.

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