CURRICULUM VITAE

Barry S. Davids

Degrees

University of Chicago	SB	Mathematics	1993
Michigan State University	MS	Physics	1995
Michigan State University	PhD	Physics	2000

Employment History

1993-1995	Teaching Assistant, Michigan State University Department of Physics
1995-2000	Research Assistant, National Superconducting Cyclotron Laboratory
2000-2003	Research Associate, Kernfysisch Versneller Instituut, Groningen, Netherlands
2003-present	Research Scientist, TRIUMF, Vancouver, Canada
2004-present	Adjunct Professor of Physics, Simon Fraser University

Awards, Committees, and Service to the Community

1988-1992	National Merit Scholar
2000	Sigma Xi Graduate Student Award
2001	Sherwood K. Haynes Award for Outstanding Graduate Student of 2000-2001, Michigan State University Department of Physics and Astronomy
2004, 2007	Lecturer, TRIUMF Summer Institute
2005-2014	Chair, TRIUMF Seminar Committee
2006, 2010	Demonstrator, TRIUMF BC Teachers' Professional Development Day
2006, '10, '13	TRIUMF Saturday Public Lecturer
2007-2008	Member, TRIUMF Users' Executive Committee
2007-2014	Chair, Nuclear Astrophysics Scientific Working Group, Canadian Institute of Nuclear Physics
2008	International Advisory Committee Member, 10th Nuclei in the Cosmos Conference
2008	Convenor, 18th International Conference on Particles and Nuclei
2009-present	Secretary-Treasurer, Division of Nuclear Physics, Canadian Association of Physicists
2009-present	Member, Joint Institute for Nuclear Astrophysics REACLIB International Advisory Committee
2012-2014	Member, American Physical Society Division of Nuclear Physics Program Committee
2012	Lecturer, US DOE and NSF Exotic Beam Summer School

Referee for: L'Agence Nationale de la Recherche of France, European Physical Journal A, International Journal of Modern Physics E, Monthly Notices of the Royal Astronomical Society Letters, the Natural Sciences and Engineering Research Council of Canada, Nuclear Instruments and Methods in Physics Research A, Nuclear Instruments and Methods in Physics Research B, Nuclear Physics A, Physical Review C, Physical Review Letters, Physics Letters B, and the US National Science Foundation

Highly Qualified Personnel Supervised

Undergraduate students:	10
MS students:	3
PhD students:	4
Research Associates:	7

Publications and Talks

Refereed Journal Publications:	84
Refereed Conference Publications:	9
Invited Conference Talks:	29
Seminars & Colloquia:	30

Most Significant Research Contributions

B. Davids *et al.*, Measurement of *E2* Transitions in the Coulomb Dissociation of ^{8}B, Physical Review Letters 81, 2209 (1998). This measurement of the longitudinal momentum distribution of ^{7}Be fragments from the Coulomb dissociation of ^{8}B was the first to provide definitive evidence that $E2$ transitions play a measurable role in the reaction mechanism. This is significant because Coulomb dissociation is the inverse of the radiative capture reaction ^{7}Be$(p,\gamma)^8$B, which produces the dominant source of high energy solar neutrinos. The radiative capture reaction proceeds only via $E1$ transitions, so the $E2$ component in the Coulomb dissociation must be known in order to deduce the $E1$ component relevant to the astrophysically important inverse reaction from Coulomb breakup.

B. Davids *et al.*, $S_{17}(0)$ Determined from the Coulomb Breakup of 83 MeV/nucleon ^{8}B, Physical Review Letters 86, 2750 (2001). A kinematically complete measurement was made of the Coulomb dissociation of ^{8}B nuclei on a Pb target at 83 MeV/nucleon. The cross section was measured at low relative energies in order to infer the astrophysical S factor for the ^{7}Be(p,γ)^{8}B reaction. A first-order perturbation theory analysis of the reaction dynamics including $E1$, $E2$, and $M1$ transitions was employed to extract the $E1$ strength relevant to neutrino-producing reactions in the solar interior. By fitting the measured cross section from E_{rel} = 130 keV to 400 keV, we find $S_{17}(0)$ = 17.8 $^{+1.4}_{-1.2}$ eV b.

B. Davids *et al.*, The Astrophysical Rate of ^{15}O$(\alpha,\gamma)^{19}$Ne via the (p,t) Reaction in Inverse Kinematics, Physical Review C 67, 065808 (2003). A recoil coincidence technique was applied to measure the α-decay branching ratios of near-threshold states in ^{19}Ne. Populating these states using the (p,t) reaction in inverse kinematics, we detected the recoils and their decay products with 100% geometric efficiency using a magnetic spectrometer. Combining our branching ratio measurements with independent determinations of the radiative widths of these states, we calculate the astrophysical rate of ^{15}O$(\alpha,\gamma)^{19}$Ne. Using this reaction rate, we perform hydrodynamic calculations of nova outbursts and conclude that no significant breakout from the hot CNO cycles into the rp process occurs in novae via ^{15}O$(\alpha,\gamma)^{19}$Ne.

B. Davids and C. N. Davids, EMMA: a recoil mass spectrometer for ISAC-II at TRIUMF, Nuclear Instruments and Methods in Physics Research A 544, 565 (2005). This article describes my ion optical design of EMMA, an electromagnetic mass analyzer for ISAC-II at TRIUMF. EMMA is a recoil mass spectrometer that will be used to separate the recoils of nuclear reactions from the beam, and to disperse them according to mass/charge. ISAC-II will provide intense, low-emittance beams of unstable nuclei with masses up to 150 u and maximum energies of at least 6.5 A MeV. EMMA will be used in many different types of experiments with radioactive beams, especially those involving fusion-evaporation and transfer reactions. As such, it must be both efficient and selective, possessing large acceptances in angle, mass, and energy without sacrificing the necessary beam suppression and mass resolution. EMMA was funded by the Natural Sciences and Engineering Research Council of Canada in 2006 at the $2.1M level.

S. Mythili, B. Davids *et al.*, Lifetimes of States in ^{19}Ne above the ^{15}O + α Breakup Threshold, Physical Review C 77, 035803 (2008). The ^{15}O$(\alpha,\gamma)^{19}$Ne reaction plays a role in the ignition of Type I x-ray bursts on accreting neutron stars. The lifetimes of states in ^{19}Ne above the ^{15}O + α threshold are important inputs to calculations of the astrophysical reaction rate. These states were populated in the ^{3}He(^{20}Ne,α)^{19}Ne reaction. The lifetimes of six states above the threshold were measured using the Doppler shift attenuation method. For the most important state we achieved a precision 4 times higher than the only measurement made outside of TRIUMF.