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Electron collisions with Fe peak elements : Application of PRMAT parallel R-matrix codes P.G. BURKE, A. HIBBERT, B.M. MCLAUGHLIN, C.A. RAMSBOTTOM, M.P. SCOTT, Queen's University Belfast, V.M. BURKE, C.J. NOBLE, A.G. SUNDERLAND, CCLRC Daresbury Laboratory — One of the outstanding problems in electron collisions with atoms and ions is the accurate calculation of cross section data for low ionisation stages of iron peak elements such as iron, nickel and cobalt. There are a number of difficulties which arise from open d-shells in the target states of these ions. Firstly, a large CI expansion is required to adequately represent electron correlation effects within the target ion, and secondly, the open d-shells give rise to a large number of target states, and in turn to a large number of coupled channels. Furthermore, calculations must be carried out over a very fine energy mesh in order to resolve low-lying Rydberg resonances. These difficulties have necessitated a major redevelopment of the standard scalar R-matrix codes to produce the parallel PRMAT codes. These new codes are being applied to the study of electron collisions with a number of ions including FeII, FeIII, FeIV and NiV . Results, illustrating the importance CI in both the target and final continuum states wavefunctions, will be reported at the conference.

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