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ASSESSING ATOMIC MODELS FOR FORBIDDEN TRANSITIONS

Peter Young

*Space Science and Technology Department, CCLRC Rutherford Appleton Laboratory, Chilton, Didcot,
Oxfordshire, OX11 0QX, England, UK*

Email: p.r.young@rl.ac.uk

Forbidden transitions within the ground transitions of ions are found at IR, optical and UV wavelengths and provide important diagnostics for studying astronomical objects. In photoionized plasmas, the temperature at which an ion is found is often well below that for the same ion in an electron-ionized plasma, and so calculated electron excitation rates need to span a wide range of temperature (typically 3-4 orders of magnitude) to be applicable in the two cases.

The CHIANTI database contains assessed excitation data for most ions of astrophysical importance, but was initially focussed towards electron-ionized plasmas, in particular for modelling the emission from the solar corona. Now, ten years later, around 1/3 of the applications of CHIANTI are to non-solar astrophysics, including studies of supernova remnants, T Tauri stars and galaxy clusters. A study is underway to ensure that CHIANTI contains the best available atomic data for the important forbidden transitions, and that the temperature coverage of the collision strengths is suitable for applications to photoionized plasmas. The results of the study will be presented and areas where atomic data needs improving highlighted.