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Type: **Poster Presentation**

## Atomic processes in gaseous nebulae

*Thursday, 14 July 2011 17:00 (2 hours)*

The atomic physics relevant to gaseous nebulae is critically examined using modeling software with particular emphasis on recombination spectral lines that occur in the radio regime. The spectral line intensities that we observe from nebulae can be deduced if we know the population structure of the bound electrons in the gas under non-thermal equilibrium conditions. The population structure of hydrogen is solved for various environments using a capture-collision-cascade model.

The validity of assuming Case B of Baker Menzel (1938) when modeling astronomical nebulae is investigated. It is known that Case B is appropriate for levels with small principle quantum numbers ( $n < 40$ ), but this assumption should be re-examined for high energy levels which are relevant to radio recombination lines.

The effect of an ambient radiation field on the population structure is examined and processes that are stimulated by a radiation field are included in the model. This is done as a preliminary investigation to extend the model to a full photoionization code that will be geometry-dependent and include an external radiation field as well as the diffuse field that is emitted by the nebula itself.

**Level (Hons, MSc, &nbsp; PhD, other)?**

MSc

**Consider for a student &nbsp; award (Yes / No)?**

Yes

**Would you like to <br> submit a short paper <br> for the Conference <br> Proceedings (Yes / No)?**

Yes

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**Session Classification:** Poster2

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