

THE RADIO RECOMBINATION LINES OF HYDROGEN; RECENT DEVELOPMENTS

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At the previous conference in this series (SCSLSA9) new calculations were presented for the electron impact widths of the radio recombination lines of hydrogen (Peach 2014). These confirmed previous theoretical results so that a longstanding discrepancy between the observations (see Bell *et al.* 2011, Bell 2012), and theory remained unresolved. There has been some controversy concerning the analysis of the observations made by Bell *et al.* (2011), see Alexander and Gulyaev (2012, 2015), whose results agree qualitatively with the present theory. Therefore in the work to be presented here, the role of proton perturbers is reexamined in more detail using impact theory. This takes into account the fact that in treating the collision processes the masses of the hydrogen atom and its proton perturber are almost the same, see Hartmann, Boulet and Robert (2008).

References

- Alexander, J. and Gulyaev, S.: 2012, *Astrophys. J.*, **745**, 194 (6pp).
Alexander, J. and Gulyaev, S.: 2015, private communication.
Bell, M. B., Avery, L. W., Macleod, J. M. and Valleé, J. P.: 2011, *Astrophys. Space Sci.*, **333**, 377.
Bell, M. B.: 2012, *Astrophys. Space Sci.*, **340**, 127.
Hartmann, J.-M., Boulet, C. and Robert, D.: 2008, *Collisional Effects on Molecular Spectra* (Elsevier, Amsterdam, The Netherlands), p 100.
Peach, G.: 2014, *Adv. Space. Res.*, **54**, 1180.