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**Study of Rydberg lifetimes in BEC<sup>1</sup>** JOVICA STANOJEVIC, ROBIN COTE, Department of Physics, University of Connecticut, Storrs, CT 06269, USA — Recent experiments are probing the behavior of Rydberg atoms immersed in an atomic Bose-Einstein condensate (BEC). One of the surprising result is the large shortening of the lifetime of the Rydberg state, by orders of magnitude compared to Rydberg atoms in vacuum. In this presentation, we explore possible processes that might explain these observations. In particular, we investigate the  $\ell$ -mixing arising from the electron scattering with many perturbers, and reactions involving the positive Rydberg core. We will compare our results to the experimental values.

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