

Abstract Submitted  
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**A Rydberg impurity in a Fermi sea.**<sup>1</sup> JOHN SOUS, University of British Columbia, ITAMP, and Harvard University, RICHARD SCHMIDT, Max-Planck-Institute for Quantum Optics and ITAMP, EUGENE DEMLER, Harvard University, HOSSEIN SADEGHPOUR, ITAMP — Mesoscopic Rydberg impurities in Bose-Einstein condensates have emerged as a new platform to study impurity dynamics in a many-body bosonic environment revealing unique features such as polaronic dressing by molecule formation and a Gaussian spectrum, both of which were measured in recent experiments. We study the problem of a Rydberg impurity in a Fermi sea and analyze the absorption spectrum using an exact functional determinant approach. The long-range Rydberg potential leads to qualitatively different physics from the case of contact interactions in Fermi polaron problems. We discuss the implications of our results for impurity excitations in fermionic ultracold atomic systems.

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John Sous  
University of British Columbia, ITAMP, and Harvard University

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