Abstract Submitted
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**Spectral function and dark continuum of the resonant Fermi Polaron**[1] OLGA GOULKO, UMass Amherst, ANDREY MISHCHENKO, RIKEN Center for Emergent Matter Science (CEMS), NIKOLAY PROKOFEV, BORIS SVISTUNOV, UMass Amherst — The Fermi polaron is an impurity interacting with a sea of fermions. It is an exemplary system to study impurity problems, strongly imbalanced Fermi gases and quasiparticles. Experiments probe its spectral function, which is directly linked to many physical properties. We present the first numerical results for the polaron spectral function with controlled error bars, obtained from first principles with diagrammatic Monte Carlo and analytic continuation. The spectral function exhibits a narrow ground state peak and another broad peak at positive energy, which are separated by a region of extremely low spectral weight. This "dark continuum" surprisingly starts to emerge in the absence a small parameter, around $k_F a \sim 1$, and quickly broadens into a gap-like structure deeper on the BEC side. We confirm that the dark continuum is indeed physical and not an artefact of approximate calculations and establish a controlled upper bound on its integrated weight.

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