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Electron-Hole Asymmetries in the Locally Inverted $\alpha^2F(\omega)$ Spectrum of a Conventional Superconductor by STM FRANCIS NIESTEMSKI, Stanford University / SLAC, STEVEN JOHNSTON, UBC, ALEX CONTRYMAN, CHARLIE CAMP, TOM DEVEREAUX, HARI MANOHARAN, Stanford University / SLAC — Utilizing scanning tunneling microscopy to create a superconductor-vacuum-superconductor junction, we invert the measured spectroscopy of the archetypal elemental superconductor Pb utilizing strong-coupling Eliashberg theory to obtain a local $\alpha^2F(\omega)$. This is the STS vacuum analogue of the pioneering McMillan and Rowell sandwich junction [W. L. McMillan and J. M. Rowell Phys. Rev. Lett. 14, 108-112 (1965)]. We find broad underlying agreement with McMillan and Rowell highlighted by previously unobserved electron-hole asymmetries and new fine structure which we discuss in terms of both conventional and unconventional superconducting bosonics.

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