Evolution of the superconducting state through quantum criticality in CeRh$_{1-x}$Co$_x$In$_5$ JOHNPIERRE PAGLIONE, Center for Nanophysics and Advanced Materials, Department of Physics, University of Maryland, M.A. TANATAR, J.P. REID, LOUIS TAILLEFER, Département de Physique, Université de Sherbrooke, Canada, M.B. MAPLE, Department of Physics and Institute of Pure and Applied Physical Sciences, University of California, San Diego — The Ce-based 115 materials exhibit a host of novel ground states separated by experimentally tunable quantum instabilities. In the single-crystal alloy series CeRh$_{1-x}$Co$_x$In$_5$, long range antiferromagnetic order is gradually suppressed upon chemical substitution of Co for Rh and followed by a robust superconducting state extending to the 2.3 K transition of the infamous heavy-fermion superconductor CeCoIn$_5$. Here we present a thorough study of heat transport measurements of high-quality single crystals of CeRh$_{1-x}$Co$_x$In$_5$ for several different superconducting samples spanning both the coexistent magnetic and non-magnetic regions of the $x$-$T$ phase diagram. By extracting the residual ($T \to 0$ limit) electronic thermal conductivity of samples at several $x$ values, we analyze the nature of the superconducting state on either side of the incipient quantum critical point near $x \simeq 0.65$ and study the influence of coexistent magnetism on the pairing state of these materials.

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