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Effects of Rhenium doping on the high magnetic field versus temperature phase diagram of URu2Si2 SONIA FRANCOUAL, NEIL HARRISON, MARCELLO JAIME, SCOTT BAILY, ALEX LACERDA, National High Magnetic Field Laboratory, Los Alamos National Laboratory, NICHOLAS BUTCH, BRIAN MAPLE, University of California, San Diego — Magnetoresistance and magnetization measurements carried out in $URu_{2-x}Re_xSi_2$ at low temperatures and high magnetic fields for x values of the rhenium doping between 0.01 and 0.10 enable us to investigate the robustness of the multiple ordered phases previously identified in URu_2Si_2 near the putative metamagnetic quantum critical point at fields around 37 $\pm$ 1 T. From the transport study, rhenium doping is shown to reduce considerably the elliptical region occupied by the hidden order phase in the (H, T) phase diagram and to shift to lower fields the broad magnetoresistivity maximum observed in the high temperature phase. In addition, the upper temperature limit at which the field-induced phase transitions are observed inside the metamagnetic crossover region in the magnetization curves decreases rapidly with increasing rhenium doping. All results tend to indicate that for $x < 0.10$ the dilute substitution of Re in place of Ru in URu_2Si_2, unlike Rh substitution, weaken the ordering in the vicinity of the putative quantum critical point.

Sonia Francoual
National High Magnetic Field Laboratory, Los Alamos National Laboratory

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