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Superconductor-Insulator transition in long Mo-Ge nanowires HYUNJEONG KIM, ANDREY ROGACHEV, University of utah — We have studied transport properties of two series of long (1-25μm) and very narrow (9-20nm) homogenous amorphous Mo-Ge wires fabricated by advanced electron beam lithography. We observed that the wires undergo a superconducting-insulator transition that is controlled by the wire cross sectional area, i.e. by local physics. Reduction of mean-field critical temperature can be explained by the fermionic mechanism. We also observed an unusual zero-bias anomaly in the insulating state that has signatures of both Coulomb blockade and perturbative electron-electron interaction correction. In addition, some of our long superconducting wires appear to be localized superconductor, namely in these wires one-electron localization lengths is several times shorter than the length of a wires.

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