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End current injection contacts for transport studies in CDW materials¹ ABDEL F. ISAKOVIC, Physics Dept., LASSP, Cornell University, KATARINA CIOCIK, NIST, Boulder, ROBERT E. THORNE, Physics Dept., LASSP, Cornell University — Current contacts to whisker- or rod-like crystals of quasi-one-dimensional conductors are generally applied to their sides. Effects associated with the resulting anisotropic current injection have long complicated interpretation of transport measurements. We have developed a method to microfabricate end current contacts. This method allows direct injection along the one-dimensional axis, greatly reduces spreading and contact resistances, and produces more uniform current densities. Using these contacts, we have been examining the physics of phase slip and single-particle to collective current conversion in the CDW conductors NbSe₃ and TaS₃, and in particular how the excess voltage required for phase slip varies with current and temperature. End contacts also modify the magnitude and temperature dependence of the CDW's depinning threshold. Our analysis shows that the activation voltage for the nucleation of topological dislocations increases with decreasing temperature, and varies from typically 20 mV at 110 K to 80 mV at 80 K.

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