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Capillary freezing of ionic liquids confined between metallic interfaces JEAN COMTET, ANTOINE NIGUS, VOJTECH KAISER, LYDRIC BOCQUET, ALESSANDRO SIRIA, Ecole Normale Superieure — Using a quartz tuning fork based AFM, we investigate the behavior of ionic liquids under confinement. Using nanorheological measurements, we show that nanometric confinements can lead to solidification and capillary freezing of the ionic liquid. We find that the critical confinement at which the liquid-solid transition occurs depends strongly on the bulk electronic properties of the confining substrate, with stronger effects observed for more metallic surfaces. This behavior is rationalized on the basis of a Gibbs-Thompson framework for the shift of the freezing transition, taking into account surface energies with the imperfect metal at the level of a Thomas-Fermi model. Finally, we show that capillary freezing can also be tuned by electrifying the confining interfaces.

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