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Stability and collapse of a dipolar condensate in a 1D optical lattice[1] MATTIA JONA-LASINIO, LUIS SANTOS, Leibniz University of Hannover, STEFAN MULLER, JULIETTE BILLY, EMANUEL HENN, HOLGER KADAU, AXEL GRIESMAIER, TILMAN PFAU, 5 Institute of Physics, University of Stuttgart — The stability properties of a dipolar condensate are strongly affected by the external confining potential, as a consequence of the long range and anisotropic character of the dipole-dipole interaction. In contrast to a contact interacting gas, the presence of a 1D lattice induces a crossover from a dipolar destabilized to a dipolar stabilized regime for increasing lattice depth. In the deep lattice regime, a dipolar condensate can be stabilized at large negative scattering length in the interaction-dominated regime. As a consequence of the dipolar potential shape, the condensate collapse in the deep lattice regime features a *local* character (as opposed to the global character of the usual contact interacting gas): the condensate develops a surface density modulation resulting in several isolated local collapses. Finally, the stabilizing effect of the external potential plays an important role during the time-of-flight expansion. A dipolar condensate can be stable as long as it is trapped but can immediately collapse as soon as the external potential is removed. This makes the mapping of the time of flight expansion onto the momentum distribution highly non trivial.

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