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Mean-field limits for Coulomb-type dynamics

Systems of N particles evolving according to the gradient flow (or similar conservative flow) to some interaction energy typically converge as N gets large to mean field limit evolution PDEs, this has been proven in the case of sufficiently regular interactions. The case of Coulomb or more singular interactions had remained an open question. We will describe a result based on a new modulated energy approach which allows to treat Coulomb and Riesz interaction (inverse power s of the distance with s between d-2 and d where d denotes the dimension).

Time allowing we also discuss related results for Ginzburg-Landau vortex dynamics.