Mean field limits and singular kernels : some recent advances

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In this talk, I will present mathematical justifications for mean field limits with singular kernels based on the control of appropriate weights. These weights must be dynamic and fully relevant to the problem under consideration. We will explain some recent results obtained with Pierre-Emmanuel Jabin (Penn-State) and initially with Z. Wang (Peking Univ) then in a second time with J. Soler (Granada Univ.) respectively around systems of order 1 and then around systems of order 2. This idea of well-adapted dynamical weights finds for us its origin in a joint work with P.-E. Jabin on compressible Navier-Stokes.