Mean Field games and nonlinear Schrödinger equations.

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Mean field games have been introduced independently and in two different contexts by J.M. Lasry and P.L. Lions, and by M. Huang, R. P. Malhamé et P. E. Caines, as a simplifying assumption, directly inspired from the "mean field" approach of Statistical Physics, to problems of Game Theory in the limit of a large number of players. However, the behavior of these models remains very difficult to analyze, in particular because of a structure which depends both of the past (the distribution of players) and of the future (their rational expectations). After a general introduction to these models, I will consider a specific class of them, the "quadratic" games, for which there exists a deep and surprising relationship with the nonlinear Schrödinger equation, which allow in particular to introduce a number of tools in this field, and get some understanding on their behavior.

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