MINI-COURSE *Introduction to the Schrödinger-Maxwell problem*
(5 hours)
prof. I. Ianni

- The Schrödinger-Maxwell system: definition of weak-solution, reduction to a nonlocal scalar equation, variational formulation, overview on the main results we will show and on the main techniques we will need.

- Introduction to Critical Point Theory: functionals on Banach spaces, differentiation, critical points, minimization.

- Palais-Smale sequences, deformations and Mountain-pass Theorem

- Application to the Schrödinger-Maxwell equation to prove existence results. Some non-existence results.

- Hints about multiplicity, existence of nodal solutions, lack of Palais-Smale condition and open problems.

ABSTRACT

The aim of this course in to introduce the students to the Schrödinger-Maxwell equation and to the main techniques used in current research to study this and other nonlinear elliptic equations.

After a short presentation of the equation, we will cover some basic topics from critical point theory in order to provide the main abstract tools of nonlinear analysis.

Hence we will apply these techniques to the Schrödinger-Maxwell equation obtaining standard existence results.

Last we will discuss some more advanced problems and open question.