

Si avvisano gli interessati che **Lunedì 24 Ottobre 2022 alle ore 15:30**, nell'Aula Seminari del Dipartimento (Aula n. 18),

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terrà la conferenza dal titolo

Soliton solutions for quasilinear modified Schrödinger equations

Summary. The quasilinear modified Schrödinger equation

$$-\operatorname{div}(g^2(u)\nabla u) + g(u)g'(u)|\nabla u|^2 + V(x)u = f(x, u) \quad \text{in } \mathbb{R}^3, \quad (\text{SP})$$

which describes both the superfluid film equation in Plasma Physics and the self-channelling of a high-power ultrashort laser if $g^2(u) = 1 + \frac{[(l(u^2))']^2}{2}$ with $l(s) = s$, respectively $l(s) = \sqrt{1+s}$, is a model problem of the quasilinear elliptic equation

$$-\operatorname{div}(A(x, u)|\nabla u|^{p-2}\nabla u) + \frac{1}{p}A_u(x, u)|\nabla u|^p + V(x)|u|^{p-2}u = f(x, u) \quad \text{in } \mathbb{R}^N, \quad (\text{QP})$$

with $p > 1$, $N \geq 2$, where $A(x, u)$, $A_u(x, u) = \frac{\partial A}{\partial u}(x, u)$ and $f(x, u)$ are Carathéodory functions on $\mathbb{R}^N \times \mathbb{R}$ while potential $V : \mathbb{R}^N \rightarrow \mathbb{R}$ is a strictly positive measurable function.

Taking $F(x, u) = \int_0^u f(x, s) ds$, suitable assumptions on $A(x, u)$, $f(x, u)$ and $V(x)$ set off the variational structure of (QP) and its related functional is

$$\mathcal{J}(u) = \frac{1}{p} \int_{\Omega} A(x, u)|\nabla u|^p dx + \frac{1}{p} \int_{\Omega} V(x)|u|^p dx - \int_{\Omega} F(x, u) dx,$$

which is C^1 but not verifies the classical Cerami-Palais-Smale condition on a “good” Banach space X which can be equipped with two different norms.

Anyway, by means of approximation arguments on bounded sets and following an approach which exploits the interaction between such two norms, we can use a variational approach for stating the existence of a nontrivial weak positive bounded solution of (QP) and then of a soliton solution of (SP).

These results are part of joint works with Giuliana Palmieri, Addolorata Salvatore and Caterina Sportelli.