

# 國立清華大學數學系學術演講

## NTHU MATH Colloquium

講題 On the nodal solutions of Schrödinger-Poisson systems

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時間 2021.01.04 (Mon.) 15:30 – 16:30

地點 Room 101, General Building III

茶會 15:00, R707

### Abstract

In this talk, we will study the non-autonomous Schrödinger-Poisson system in the form:

$$\begin{cases} -\Delta u + u + \lambda K(x)\phi u = f(x) |u|^{p-2}u & \text{in } \mathbb{R}^3, \\ -\Delta \phi = K(x)u^2 & \text{in } \mathbb{R}^3, \end{cases} \quad (SP_\lambda)$$

where  $\lambda > 0$ ,  $2 < p < 6$  and the functions  $f(x)$  and  $K(x)$  are nonnegative continuous functions. In general, the existence of nodal solution for Schrödinger-Poisson systems with  $4 \leq p < 6$  can be established by using the nodal Nehari manifold method. However, for the case of  $2 < p < 4$ , such an argument is not applicable because Palais-Smale sequences restricted on the nodal Nehari manifold can be not bounded. In this talk, we will introduce a novel constraint method to prove the existence of nodal solution to a class of non-autonomous Schrödinger-Poisson systems in the case of  $2 < p < 4$ . We conclude that such solution changes sign exactly once in  $\mathbb{R}^3$  and is bounded in  $H^1(\mathbb{R}^3) \times D^{1,2}(\mathbb{R}^3)$ . Moreover, the existence of least energy nodal solution is obtained in the case of  $\frac{1+\sqrt{73}}{3} < p < 4$ , which remains unsolved in the existing literature. This work joint with Juntao Sun.