Non-Degeneracy of Multi-Bubbling Solutions for the Prescribed Scalar Curvature Equations and Applications

1:30-2:30 PM, by Shusen Yan, Central China Normal University

Abstract. We consider the following prescribed scalar curvature equations in $\mathbb{R}^N$:

\begin{align}
-\Delta u &= K(|y|)u^{2^*-1}, & u > 0 \text{ in } \mathbb{R}^N, & u \in D^{1,2}(\mathbb{R}^N),
\end{align}

where $K(r)$ is a positive function, $2^* = \frac{2N}{N-2}$. We first prove a non-degeneracy result for the positive multi-bubbling solutions constructed in the paper [J. Wei, Y. Yan, Infinitely many solutions for the prescribed scalar curvature problem on $\mathbb{S}^N$, J. Funct. Anal. 258(2010), 3048–3081] by using the local Pohozaev identities. Then we use this non-degeneracy result to glue together bubbles with different concentration rates to obtain new solutions.

A Schrodinger System from Nonlinear Optics and Bose–Einstein Condensation

2:30-3:30 PM, by Zhaoli Liu, Capital Normal University

Existence and multiplicity of nontrivial solutions to the Schrödinger system

\begin{align}
-\Delta u + \lambda u = \sum_{i=1}^{N} |u_i|^2 u_i
\end{align}

in $\mathbb{R}^N$ with $u_i(x) \to 0$ as $|x| \to \infty$, which stems from various aspects in physics, including nonlinear optics and Bose-Einstein condensates, have been studied extensively in the last two decades. In this talk, I will present some results in this direction.

Axially Symmetric Solutions of Allen-Cahn Equation

4:00-5:00 PM, by Changfeng Gui, University of Texas at San Antonio

In this talk, I will present recent results on axially symmetric solutions of Allen-Cahn equation. For the existence results, we show in three dimensional Euclidean space the existence of a complete family of axially symmetric solutions with a range of logarithmic growth rates, which may be regarded as the analogue of the family of catenoids and hence called two-end solutions. Nonexistence of two-end solution with a small growth rate is also shown, which differs from the theory of minimal surfaces. For the classification of axially symmetric solutions with finite morse index, we show in dimension three that such solutions have finitely many ends. Furthermore, the solution has exactly two ends if its Morse index equals 1. It is also shown that there does not exist such a solution in dimensions between 4 and 10.