PCS NEWSLETTER

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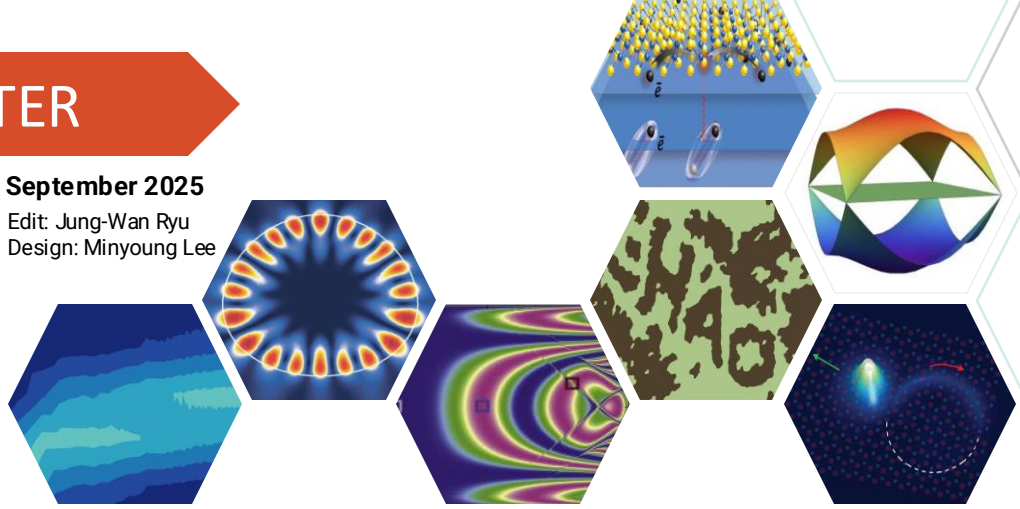
PCS IBS Seminars

"Liquid O: Radiation Detection Beyond Transparency"
by Cabrera Anatael, CNRS, France (August 6), IBS Physics Colloquium @ Daejeon

You can find more seminars on this page.

ibS Institute for Basic Science

pCS Center for Theoretical Physics of Complex Systems

New Research Results

Phase locking of ring-shaped exciton-polariton condensates to coherent optical drive
A. N. Osipov, S. V. Koniakhin, O. I. Utesov, I. S. Aranson, and A. V. Yulin

The effect of additional quasiresonant drive on the dynamics of the ring-shaped incoherently pumped polariton condensates carrying angular momentum (vorticity) is studied theoretically. Numerical simulations of the 2D and 1D Gross-Pitaevskii equations show that the difference of the topological charges (vorticities) of the condensate and the quasiresonant coherent drive plays a crucial role in their synchronization dynamics. The topological charge difference leads to the appearence of phase slip between the condensate and the coherent drive that can be understood in terms of the particle-like motion of abrupt kinks of 2π phase jump.
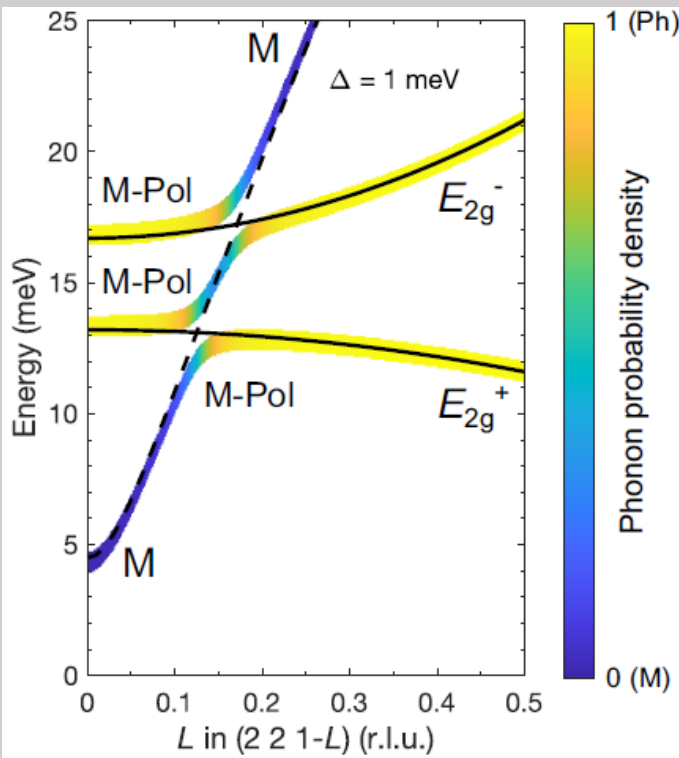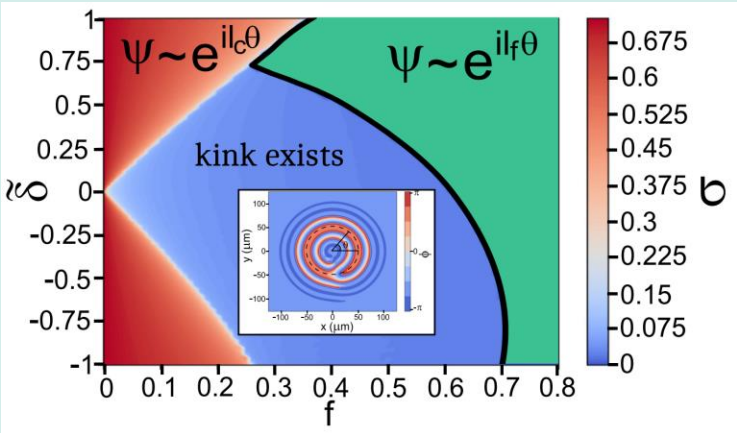
Strong Magnon-Phonon Coupling in the Kagome Antiferromagnets
A. S. Sukhanov, O. I. Utesov, A. N. Korshunov, N. D. Andriushin, M. S. Pavlovskii, S. E. Nikitin, A. A. Kulbakov, K. Manna, C. Felser

Direct experimental evidence and theoretical insights into magnon-phonon coupling in the semimetal Mn_3Ge, a kagome antiferromagnet with 120° noncollinear spin order, are reported. Inelastic x-ray scattering and ab initio calculations revealed relevant optical phonon modes. In the framework of the minimal model for the magnetic subsystem, corresponding magnon modes and their coupling to respective phonons were discussed. A large hybridization gap of ~2 meV manifests the strong coupling regime and the existence of mixed magnon-polaron quasiparticles. This study demonstrates that noncollinear kagome antiferromagnets can be a fruitful platform to study the coupling between lattice and magnetic degrees of freedom.

Puzzle of the Month

August puzzle solution:

We make two observations.
1) Both of the numbers must be greater than 15; otherwise, their double value will guarantee divisibility.
2) Both numbers must either be a prime or contain a power of a prime higher than in any smaller integer.

By direct examination starting from 16, we immediately find a pair, 16 and 17. A possible number is thus $\frac{\Pi_{k=1}^{30} k}{16 \cdot 17 \cdot 2^{19}}$.
Answer: {16,17}

The correct solution was sent in by Ihor Vakulchyk, Victor Kagalovsky, and Oleg Utesov. Congratulations!

Puzzle of the month:

A natural number N is divisible by this set of natural numbers: $\{x_1, x_2,...,x_k\}$.
Of course one of them is simply 1, and another is N.

All we know is the number N, and the sum $T = x_1 + x_2 + ... + x_k$.
What is then the value of $S = 1/x_1 + 1/x_2 + ... + 1/x_k$?

$$x_1 + x_2 + \ ... \ x_k = T$$

$$\frac{1}{x_1} + \frac{1}{x_2} + \ ... \ \frac{1}{x_k} = \ ?$$

Send your solution to mylee1@ibs.re.kr
The winner will be announced in the next issue.