Øresundseminar
Monday, 16. November 2015

Thorvaldsensvej 40, Frederiksberg
Lecture Hall A2-70.04 (3-14)

Students with interest in Mathematical Physics or Quantum Information Theory are
welcome to participate!

12:00–12:45 Social Lunch in Frederiksberg

We meet at 11:40 just outside the Copenhagen Metro stop FORUM and walk to the canteen together.
You can also come directly to the canteen.
(If you come by train from Lund, it's easiest to change to the metro at Copenhagen Airport.)

13:00–13:50 Alessandro Giuliani (Roma Tre):
Periodic striped ground states in Ising models with competing interactions

We consider Ising models in two and three dimensions, with short range ferromagnetic and long range, power-law decaying, antiferromagnetic interactions. We let J be the ratio between the strength of the ferromagnetic to antiferromagnetic interactions. The competition between these two kinds of interactions induces the system to form domains of minus spins in a background of plus spins, or vice versa. If the decay exponent p of the long range interaction is larger than $d+1$, with d the space dimension, this happens for all values of J smaller than a critical value $J_c(p)$, beyond which the ground state is homogeneous. In this talk, we give a characterization of the infinite volume ground states of the system, for $p > 2d$ and J in a left neighborhood of $J_c(p)$. In particular, we report a proof that the quasi-one-dimensional states consisting of infinite stripes ($d = 2$) or slabs ($d = 3$), all of the same optimal width and orientation, and alternating magnetization, are infinite volume ground states. We shall explain the key aspects of the proof, which is based on localization bounds combined with reflection positivity. Joint work with Robert Seiringer.

14:05–14:55 Matthias Christandl (Copenhagen): TBA

TBA

14:55–15:30 Coffee Break

15:30–16:20 Mark Groves (Saarbrücken):
Three-dimensional solitary water waves

The existence of solitary-wave solutions to the three-dimensional water-wave problem is predicted by the Kadomtsev-Petviashvili (KP) equation in the case of strong surface tension and the Davey-Stewartson (DS) system in the case of weak surface tension. The term "solitary wave" describes any solution which has a pulse-like profile in its direction of propagation, and these model equations admit three types of solitary waves. A line solitary wave is spatially homogeneous in the direction transverse to its direction of propagation, while a periodically modulated solitary wave is periodic in the transverse direction. A fully localised solitary wave on the other hand decays to zero in all spatial directions.

In this talk I outline mathematical results which confirm the existence of the three-dimensional solitary waves for the full gravity-capillary water-wave problem in its usual formulation as a free-boundary problem for the Euler equations; both strong and weak surface tension are treated.

16:35–17:25 Yacin Ameur (Lund):
Random eigenvalues, two-dimensional particle systems, and Ward identities

Ward identities are exact identities satisfied by the intensity functions of a particle system. They can be derived using reparametrization invariance of the partition function. Whereas Ward identities have been well-known in physical field theories, they were less well-known in a rigorous mathematical context until Johansson applied them in a one-dimensional situation. The corresponding two-dimensional theory is currently an active area of research, which has close connections to physical conformal field theories.

18:30 Social Dinner

Please sign up for the dinner on the doodle `http://doodle.com/poll/dqhyuawackg42u9u` at the latest on Wednesday, November 11.

The QMATH group is looking forward to meeting you in Copenhagen!
Please feel free to contact us if you have any questions.
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