Title: Phase transitions of the focusing Φ^p_1 measures

Abstract: We study the behaviour of the focusing Φ^p_1 measures on the one-dimensional torus, initiated by Lebowitz, Rose, and Speer (1988). Because of the focusing nature of the measure, it is necessary to introduce a mass cutoff K, and restrict the measure to the set where the mass is smaller than K. We will show the following phase transitions:

- When K is smaller than a certain threshold, the measure is well defined, while for K bigger than the threshold, the measure becomes non-normalisable. We will also discuss what happens at the optimal threshold, and show that the measure is well defined in this case as well, solving a long-standing open problem. This is a joint work with T. Oh (University of Edinburgh) and P. Sosoe (Cornell University).

- When the size L of the torus is going to infinity, in the weakly non-linear regime, numeric simulations in the original paper by Lebowitz, Rose, and Speer (1988) suggest a phase transition depending on the temperature of the system. We show that this is indeed the case: if the temperature is high, the Φ^p_1 measure converges to a given gaussian measure. However, this convergence does not happen in the low-temperature regime, and instead the measure progressively concentrates around a single soliton. This is a joint work with H. Weber (University of Bath).