1152-70-425 **Alexander Tovbis*** (alexander.tovbis@ucf.edu), Department of Mathematics, University of Central Florida, Orlando, FL 32816. *Soliton and breather gases for the focusing nonlinear Schrödinger equation.* Preliminary report.

Solitons and breathers are localized solutions of integrable systems that can be viewed as "particles" of complex statistical objects called soliton and breather gases.

In this talk, we discuss spectral theory of a generalized breather gas by considering a special, thermodynamic type limit of multi-phase (finite-gap) solutions of the focusing nonlinear Schrödinger equation. The family of generalized breather gases includes gas of fundamental solitons and gas of conventional breathers (solitons on finite background) as particular cases. We consider several particular cases of the generalized breather gas including the so-called bound state soliton gas, as well as some transitional regimes (condensate and ideal gas limits). (Received September 10, 2019)