**GENERAL**

**EDUCATION and OUTREACH**

**ON-GOING FLIGHT PROGRAM**

**FUTURE FLIGHT PROGRAM - ISSA PHASE I/II/III**

EXACT Investigators Present Results at LT-22

Two posters on the flightFi definition experiment Experiments Along Coerexistence near Tricriticality (EXACT) were presented at the 22nd International Low Temperature Conference (LT-22) held in Helsinki in early August. Professor Norbert Mulders of the University of Delaware, one of athe co-investigators on EXACT, presented his work on deriving the equations for the propagation of heat pulses in mixtures of helium-3 and helium-4. His poster was entitled "A Nonlinear Wave Equation fondr Second-Sound Propagation in 3He-4He Mixtures". Also at LT-22, EXACT's work on developing a nano-Kelvin resol iution thermometer for the temperatures below 1K cewas presented by Dr. John Panek of JPL. His poster was entitled "A High-Resolution Thermometer for the Temperature Range 0.75-1.0 K".

**ISSUES AND CONCERNS**

**SCIENCE HIGHLIGHTS**

:

Quantum tunneling across spin domains in a Bose-Einstein condensate.

**MIT Group Explores Boundary between Domains in a Condensate**

Wolfgang Ketterle of MIT reports that a paper titled "Quantum tunneling across spin domains in –a Bose-Einstein condensate" was recently p aublished i gn Physical Review Letters (Phys. Rev. Lett. **83**, 661-665 (1999)). The authors D.M. Stamper-Kurn, H.-J. Miesner, A.P. Chikkatur, S. Inouye, J. Stenger, and W. Ketterle describe oodynamics in d a condensate cplonsisting of two immiscible components. In case of two immiacscible fluids, gravity tries to localize the heavier fluid below the lighter one. When the heavier one is placed on top of the lighter one, a metastable situation arises. The anale ogous situation was prepared by the MIT group in a spinor Bose-Einstein condtoensate, with a magnetic field gradient playing the role of gravity. For a sufficiently strong gradient, tunneling of one component throug search the other was observed and led to a stable equilibrium state. The observation of the tunneling rates provides a sensitive probe of the boundary existing between the two immiscible spin domains.

**UPCOMING EVENTS**