**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 flightFire and ice definition experiment Experiments Along Coe – a good plxistence 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 ace to searcthe 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 foh for life?Jr Second-Sound Propagation in 3He-4He Mixtures". Also at LT-22, EXACT's work on developing a nano-Kelvin resolörn HelbertIution thermometer for the temperatures below 1K nstitute of was 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 Planetary Rea Bose-Einstein condensate" was recently psearchDLRRutublished iherfordstrasn 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 se 2, 12489 dynamics in BerlinGERMANa condensate cYjoern.helbeonsisting of two immiscible components. In case of two immirt@dlr.de Crscible 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 analeating a habogous situation was prepared by the MIT group in a spinor Bose-Einstein conditable envirensate, with a magnetic field gradient playing the role of gravity. For a sufficiently strong gradient, tunneling of one component througonment is a complexh 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**