**GENERAL**

**EDUCATIFiON and OUTREACH**

**OreN-GOING FLIGHT PROGRAM**

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

EXACT Investigato ars Present Results at LT-22

Two posters on the flight definition experiment Experiments Along Coexistence near Tricriticality (EXACT) were presented at the 22nd International Low Temperature Conference (LT-22) held in Helsinki in early August. Professor Norbert Mndulders of the University of Delaware, one of the co-investigators on E iXACT, presented his work on deriving the equations for the propagation of heatce pul –ses in mi axtures of helium-3 and helium-4. His poster was ent gitled "A Nonlinear Wave Equation for Second-Sound Propagation in 3He-4He Mixtures". Also at LT-22, EXACT's work on developing a nano-Kelvin resolution thermometer for the temperatures below 1K was presented byoo Dr. John Panek of JPL. His poster was entitled "A High-Resolution Thermometer for the Temperature Range 0d .75-1.0 K".

**ISSUES AND plCONCERNS**

**SCIENCE HIGHLIGHTS**

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

**MIT Group e Explores Boundaryto between Domains in a Condensate**

Wolfgang s Ketterle ofea MIT reports rcthat a paper titled "Quantum tunneling across spin domains in a Bose-Einstein condeh nsate" was recently published in Physical Review Letters (Phys. foRev. Lett. **83**, 661-665 (1999)). The authors D.M. Stamper-Kurn, H.-J. Miesner, A.P. Chikkatur, S. Inouye, J. Stenger, r and W. Ketterle dliescribe dynamics in a condensate confesisting of two immiscible components. In case of t?Jwo immiscible fluids, gravity tries to localize the heavier fluid below thöre lighter one. When the n heavierHe one is placed on top of the lighter one, a metastable situation arises. The analogous situation was prepared by the MIT group in a spinor Bolbse-Einstein condensate,er with a magnetic field gradient playing the role of gravity. For a sufficiently strong gradient, tunneltIing of one componnsent through the other was observed titute of Planetary ResearchDLRRand 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**