

shaped He-3 sample is bounded on one side by a thermalizing metal heat exchanger and on the other by a Kapton-epoxy laminate diaphragm. The design is intended to combine the advantages of the Kapton diaphragm as developed by G. Frossati<sup>2</sup> with the pancake geometry first used in a metal Pomeranchuk cell by Halperin et al.<sup>3</sup>

<sup>1</sup>B. Castaing and P. Nozieres, J. Phys. (Paris) **40**, 257 (1979).

<sup>2</sup>G. Frossati, J. Phys. (Paris) **41**, C7-95 (1981).

<sup>3</sup>W.P. Halperin, F.B. Rasmussen, C.N. Archie, and R.C. Richardson, J. Low Temp. Phys. **31**, 617 (1978).

DYb 3 Experiments on Phase Separation in <sup>3</sup>He-<sup>4</sup>He Mixture Films\*. F.M. ELLIS and R.B. HALLOCK, Univ. of Mass/Amherst--We have constructed a new apparatus to extend our studies<sup>1</sup> of phase separation in <sup>3</sup>He-<sup>4</sup>He mixture films to lower temperatures, thinner films and smaller <sup>3</sup>He concentrations. Our first measurements will be directed at situations of very low <sup>3</sup>He concentration in <sup>4</sup>He films from 2 to 10 atomic layers in thickness in an effort to probe the nature of the <sup>3</sup>He surface state on <sup>4</sup>He films of various thicknesses. The apparatus will be described and available data relevant to the surface state and phase separation presented.

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<sup>1</sup>F.M. Ellis, R.B. Hallock, M.D. Miller and R.A. Guyer, Phys. Rev. Lett. **46**, 1461 (1981).

DYb 4 Collective Mode Interactions in Helium <sup>3</sup>He-B. J.A. SAULS,\* Princeton U. and J.W. SERENE, Yale U.--The theoretical results on the interaction between zero sound and orderparameter collective modes are presented. Quasiparticle interaction effects on the collective mode frequencies in a magnetic field are also discussed.

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DYb 5 Magnetic Force Measurements on Liquid Helium\*. J.S. Brooks, G.O. Zimmerman, Boston University,\*\* and R. Meservey and P.M. Tedrow, Francis Bitter National Magnet Laboratory MIT-Experiments designed to measure the total magnetic susceptibility of liquid helium at low temperatures in high magnetic fields will be discussed and recent results presented.

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DYb 6 Heat Capacity of Solid D<sub>2</sub> Below 1K. D.G. Haase, North Carolina State University.\* The heat capacity of solid D<sub>2</sub> of 33% para-deuterium concentration has been measured for 1K > T > 0.1K. The samples were grown at low pressure in a 0.15 cm<sup>3</sup> sample volume filled with sintered copper. The heat capacity was measured by a thermal relaxation technique which also allowed investigation of thermal history effects with samples. No evidence of a phase transition was found in the samples in the temperature range associated with the quadrupolar glass phase, i.e. below 160 mK. No thermal remanence effects were observed for characteristic measurement times greater than about 30 seconds.

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DYb 7 Heat Capacity Study of the Orientational Ordering Transition of Monolayer H<sub>2</sub> Adsorbed on Graphite A.D. MIGONE, H.K. KIM, and MOSES H.W. CHAN, Penn State Univ.\*--The A.C. Calorimetric technique was used to measure the heat capacity due to the orientational ordering transition of N<sub>2</sub> adsorbed on graphite.<sup>1,2</sup> Results in the submonolayer regime indicate that the transition temperature and the heat capacity peak height

per molecule are independent of the coverage. The width of the heat capacity peak is on the order of 1K. The sharpness of the peak appears to confirm recent results<sup>1,2</sup> that the transition is first order. Results above the monolayer coverage will also be presented.

\*Supported in part by Research Corporation.

<sup>1</sup>R.D. Diehl, T.F. Toney, and S.C. Fain, Phys. Rev. Lett. **48**, 177 (1982).

<sup>2</sup>O.G. Mouritsen and A.J. Berlinsky, Phys. Rev. Lett. **48**, 181 (1982).

DYb 8 Mössbauer Measurements of Hyperfine Magnetic Field in Heusler Alloys. H. M. SEYOUM and S.JHA\*, U. of Cincinnati, GLENN M. JULIAN, Miami U. (Ohio) and JAMES W. BLUE, NASA-Lewis Research Center.--We report the results of measurements by Mössbauer technique of the hyperfine magnetic field(hmf) at <sup>119</sup>Sn at the Mn-site and at the Ge-site in Rh<sub>2</sub>MnGe and at the Pb site in Rh<sub>2</sub>MnPb. The source was <sup>119m</sup>Sn in barium stannate form. The absorbers were made by synthesizing the alloy with natural high purity constituents, 2 at % of <sup>119</sup>Sn replacing Mn in one sample, Ge in the second sample, and Pb in the third sample. The room temperature Mössbauer spectrum of Rh<sub>2</sub>MnGe<sub>1-x</sub><sup>119</sup>Sn<sub>x</sub> showed two humps, from which a hmf of 45 KOe at RT was extracted. The room temperature Mössbauer spectrum of Rh<sub>2</sub>Mn<sub>1-x</sub><sup>119</sup>Sn<sub>x</sub>Ge showed the two humps due to <sup>119</sup>Sn at the Ge-site, but in addition it also showed a central hump which was attributed to <sup>119</sup>Sn at Mn site<sup>1</sup>. The hmf at <sup>119</sup>Sn at Mn-site was estimated to be less than 10 KOe at RT. The systematics of the hmf at the s-p site in these alloys and the hmf in Rh<sub>2</sub>MnPb will be presented.

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<sup>1</sup>Le Dang Khoi, P. Veillet and I. A. Campbell: J. Phys F:Metals Phys **8**, 1827 (1975).

DYb 9 Mössbauer Studies of Hematite Under Pressure: High Precision Crystallographic Changes.\* C.L. BRUZZONE and R. INGALLS, U. of Washington.--The Mössbauer spectrum of hematite (α-Fe<sub>2</sub>O<sub>3</sub>) has been investigated over a range of pressures extending to 32.3 kbar and at temperatures ranging from 77 K to 300 K. Particular attention has been paid to the effects of the Morin (spin flip) transition on the <sup>57</sup>Fe quadrupole splitting. The anomalous reduction in the quadrupole splitting at points in P-T space near the Morin transition is explained by the application of magnetic anisotropy energy density arguments, which also provide an estimate of the mean magnetic domain size in hematite. The absence of change in isomer shift suggests the bonds retain their ionic character through this pressure range. From the low temperature quadrupole splitting data and knowledge of the pressure dependence of the Morin temperature rather precise information concerning the location of atoms within the unit cell can then be extracted. In addition, the hyperfine magnetic field is found to increase discontinuously by 1.5% through the pressure induced Morin transition, similar to the temperature induced transition at atmospheric pressure.

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DYb 10 RF Sputtered Sm-Co Films. F. J. GADIEU† S. H. ALY, and T. D. CHEUNG, Dept. of Physics, Queens College of CUNY, and R. G. PIRICH, Grumman Aerospace Corp. -- Films of the Sm-Co system have been prepared by RF tri-sputtering from a set of targets so that a range of compositions ranging from the 1-5 to the 2-17 compound are synthesized along the length of a substrate.<sup>1</sup> Films prepared onto polished substrates at deposition temperatures above 750 C produced fine grained films with the regions of different crystal phases clearly observable optically. In contrast to this when the substrates were at room temperature uniformly silver mirror smooth amorphous films were obtained. The hot substrate films exhibit increasing remanence and decreasing coercivity as the film composition varies from the SmCo<sub>5</sub> to the