One explanation for the effect is electrostriction: The density of the liquid is greater in a region of high electric field; so the lambda point will be lowered just by the pressure increase.

Another possibility, Notarys says, is that the electric field is behaving with a superfluid the way a magnetic field does with a superconductor, thus causing the phase transition to become first order and supplying the latent heat needed.

Notarys is planning to use these techniques in a search for the superfluid analog of the dc Josephson effect. He would use two containers of superfluid helium (analogous to two superconductors) separated by a weak link, a set of small pores in which one applies an electric field to turn off the superfluidity (analogous to a thin insulating layer). If the effect shows up, superfluid flow will occur across the link without a driving force. The superfluid analog to the ac Josephson effect was observed by Philip Anderson and Paul L. Richards, in 1965.

GROUNDBREAKING FOR LOS ALAMOS MESON FACTORY (PHYSICS TODAY, December 1966, page 21 and November 1967, page 75) was held indoors in February. Senator Clinton Anderson (D-N.M.), AEC Chairman Glenn Seaborg and Louis Rosen wield shovels. Bureau of the Budget has just released $3.7 million for construction; $4 million for design and engineering have already been allocated and the bureau is holding $6.7 million more in reserve. President's fiscal 1969 budget asks for $26.4 million. Total cost is $55 million.

Double Beta Decay Appears To Confirm Existing Theory

A long and careful search for double beta decay (simultaneous emission of two electrons) appears to confirm that leptons are conserved. C. S. Wu, R. K. Bardin, P. J. Gollon and J. D. Ullman of Columbia have found 69 events that may be the kind expected if leptons are conserved—that is, events in which two electrons are emitted with two neutrinos. Meanwhile, in 1100 hours of observation, they found only one event that might be a double beta decay without neutrinos.

Accepting this event leads to a lower limit of 1.6×10^{21} years (at the 80% confidence level) for neutrinoless double beta decay. This value implies that the fraction of the beta interaction amplitude that does not conserve lepton number is less than about 10^{-3}. The group has reported its results in *Physics Letters* **26B**, 112 (1967) and at the Tokyo Conference on Nuclear Structure last September.

Wu and her associates made their observations 680 meters down in an Ohio salt mine by photographing tracks in a helium-filled streamer chamber. Their apparatus (figure) had a Ca^{48} source in the center and cameras at both sides. Surrounding the chamber were counters designed to take pictures only when they saw coincident events with appropriate total energy.

The double-beta-decay search started nearly 30 years ago when the purpose was to determine whether neutrinos and antineutrinos were identical. After nonconservation of parity showed that neutrino and antineutrino have opposite helicities, emphasis shifted, and double beta decay offered the best test of lepton conservation. With lepton conservation one expects two electrons and two antineutrinos; otherwise phase-space considerations strongly favor two electrons and no neutrinos.

Thus the experiment looks for two possible decay modes: neutrinoless double beta decay, in which the electrons carry off all the available energy, and two-neutrino double beta decay, in which neutrinos and electrons share the energy, and the electrons, on the average, get about half. Observations that would show only two-neutrino decay would be confirmation of existing theory; even a little neutrinoless decay would show that leptons are not conserved.

Most searches have used isotopes predictably unstable to double beta decay surrounded by counters to detect coincident electrons. Background is always a problem; accidental coincidences, contamination with undesired beta emitters, cosmic rays, internal conversions and Compton scattering in which photons produce electrons, and even electrons that go all the way through the apparatus cause spurious counts.

Many ingenious modifications have been applied recently in efforts to beat the background. A large liquid scintillation counter was an anticoincidence shield in a recent Case Institute experiment.[1] The double-decay material was made into a scintillating crystal for a Brookhaven group[2] and into a semiconductor detector by a group at Milan.[3] At the University of Pennsylvania a group observed electron tracks in a spark chamber.[4] In all of these experiments, however, background counting rates were still much higher than the expected rate from two-neutrino double beta decay.

But streamer-chamber photographs