I. INTRODUCTION
- Second sound: a quantum mechanical phenomenon exhibited in superfluids.
- The name “second sound” is derived by analogy with first sounds where the former propagates as an entropy (temperature) wave and the latter, a density wave.
- Second sound travels at ~20 m/s in superfluid helium near 1.5-1.8K.
- Oscillating superleak transducer (OST) contains a flexible porous membrane for transmitting and blocking the movement of the superfluid and normal fluid component of the second sound wave.
- Eventually second sound triangulation will be used for SPL cavity (704MHz) quench tests at CERN.

III. SECOND SOUND RESULTS
- **Fight against noise!**
  - (1) Insulate the building ground and the cryostat.
  - (2) 120V battery charger for OST.

- **53% noise reduced**
- **Second sound amplitude decreases with the superfluid helium temperature.**
- The measurements improvement and studies will be continued to enhance the understanding of the characteristics of second sound and the OSTs.
- The measured second sound speed agreed with the theoretical curve, and the distance derived from which agrees with the measured value within error bars.

IV. OST MANUFACTURING
- Mechanical parts
  - Based on Cornell’s design
  - Used LEMO connectors instead of SMA ones
- Manufacturing process
  - Membrane (polycarbonate) sputtering
    - Ti 3 nm + Au 50 nm
    - SEM pictures
  - Non-sputtered
  - Au/Ti sputtered

V. CONCLUSION
- An efficient noise reduction increases the discernment of the second sound signal to noise level (S/N).
- Used 6 different Surface Mount Device (SMD) -- thick film resistors
- SMD 2 and 3 with better signals for analysis
- Second sound strength indicate the benefit of operating cavities below 1.8K increase the second sound amplitude.
- Heat source distance determination measured distance vs. distance derived from measured second sound velocity
  - Fixed OST
  - Adjustable OST

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