

The background of the slide is a light blue color with a complex, abstract pattern of white and light blue lines and shapes. These shapes resemble particle tracks or a network diagram, with some circular and spiral patterns interspersed with straight lines and irregular shapes. The overall effect is a technical and scientific aesthetic.

# The Fermilab P-1021 Proposal and Relationship to B0 Assets

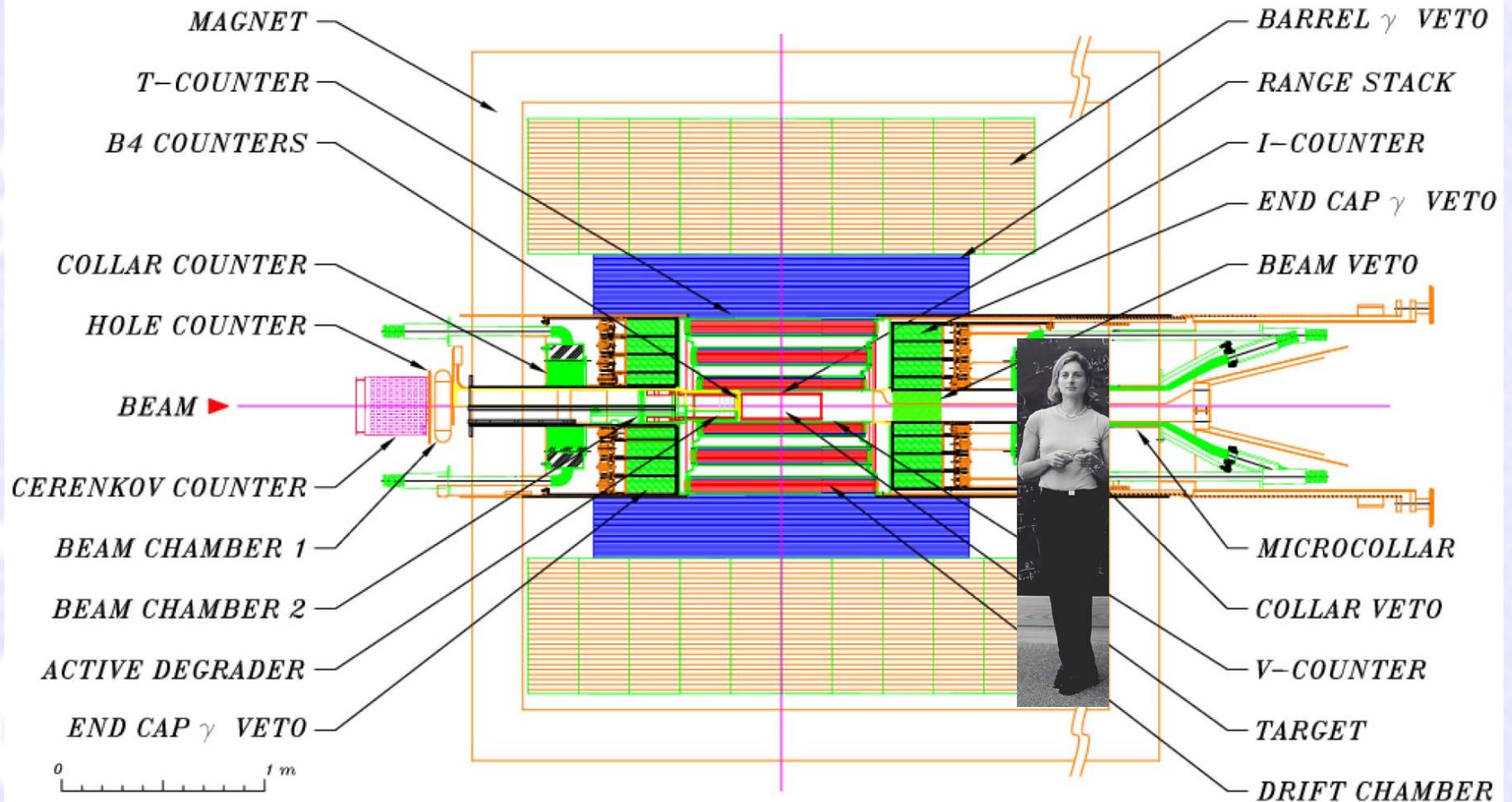
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November 9<sup>th</sup> 2011

# ORKA: The "Golden K" Experiment

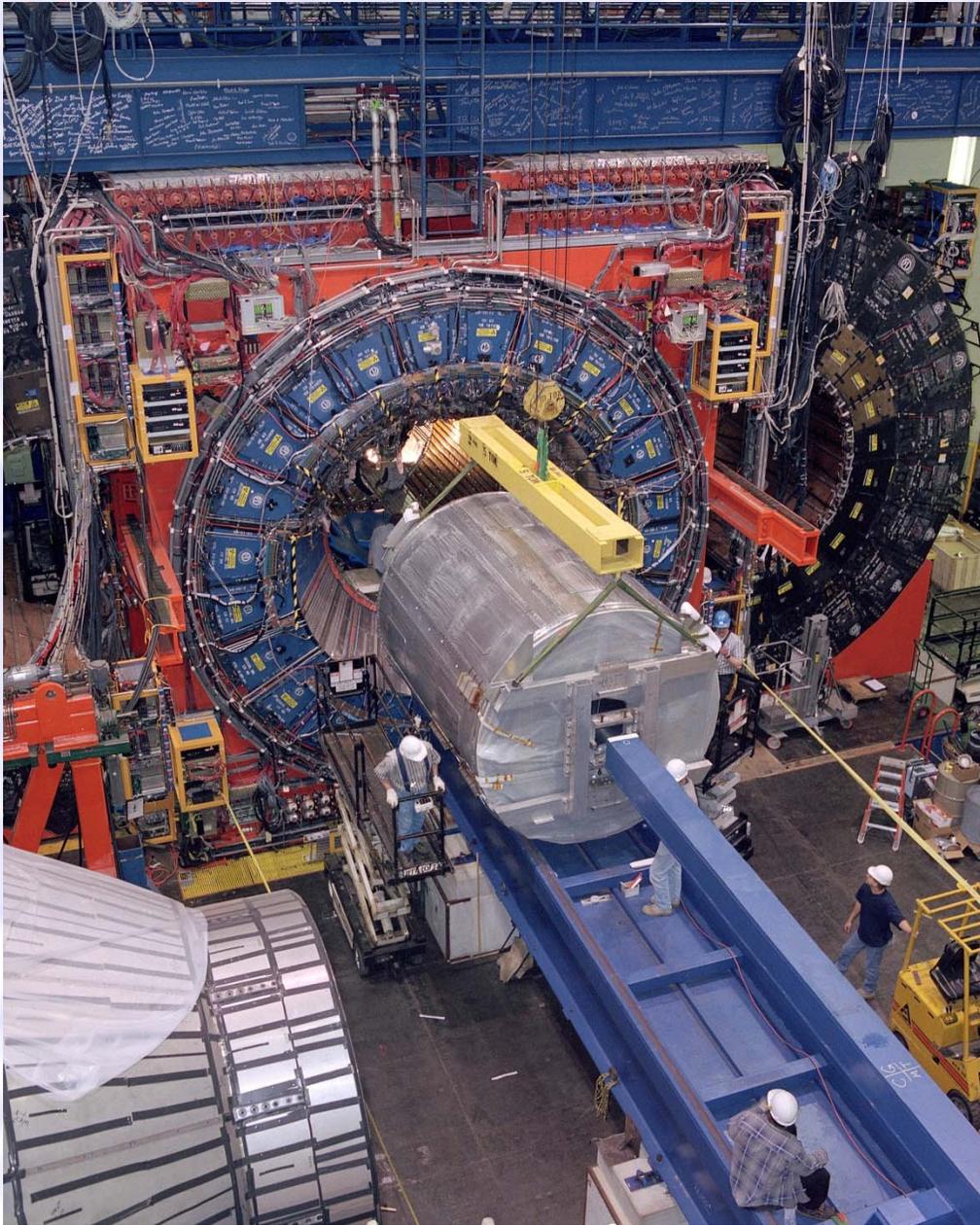


- ORKA (P-1021) is a proposal for a precision measurement of the highly sought after  $K^+ \rightarrow \pi^+ \nu \bar{\nu}$  process initially using 50kW of 95 GeV Main Injector proton beam.
- The  $K^+ \rightarrow \pi^+ \nu \bar{\nu}$  process and the related  $K_L \rightarrow \pi^0 \nu \bar{\nu}$  process are key targets in the Project-X research program. ORKA can serve as an important demonstrator experiment at the 5% power level to establish techniques and the community key to this research program.
- The ORKA detector is a cylinder of radius 1.35m and length 2.5m. (c.f. CDF COT is 1.37m radius, 3.1m long) The detector package operates in a 1.25T solenoid field.
- The ORKA experiment requires transport of 50kW of 95 GeV Main Injector beam from F0 to the experiment site.

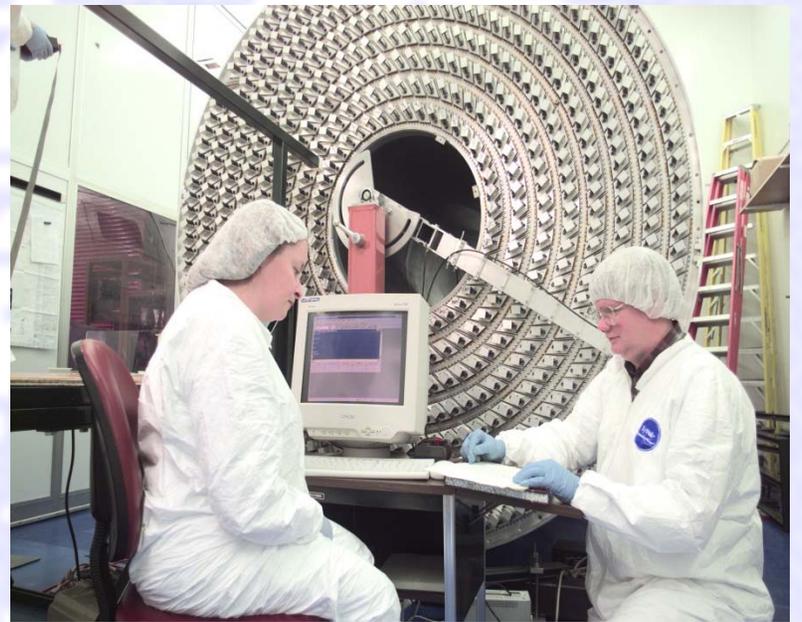
# ORKA: Precision measurement of $K^+ \rightarrow \pi^+ \nu \bar{\nu}$



Lisa Randall with the experiment that discovers evidence for extra dimensions...

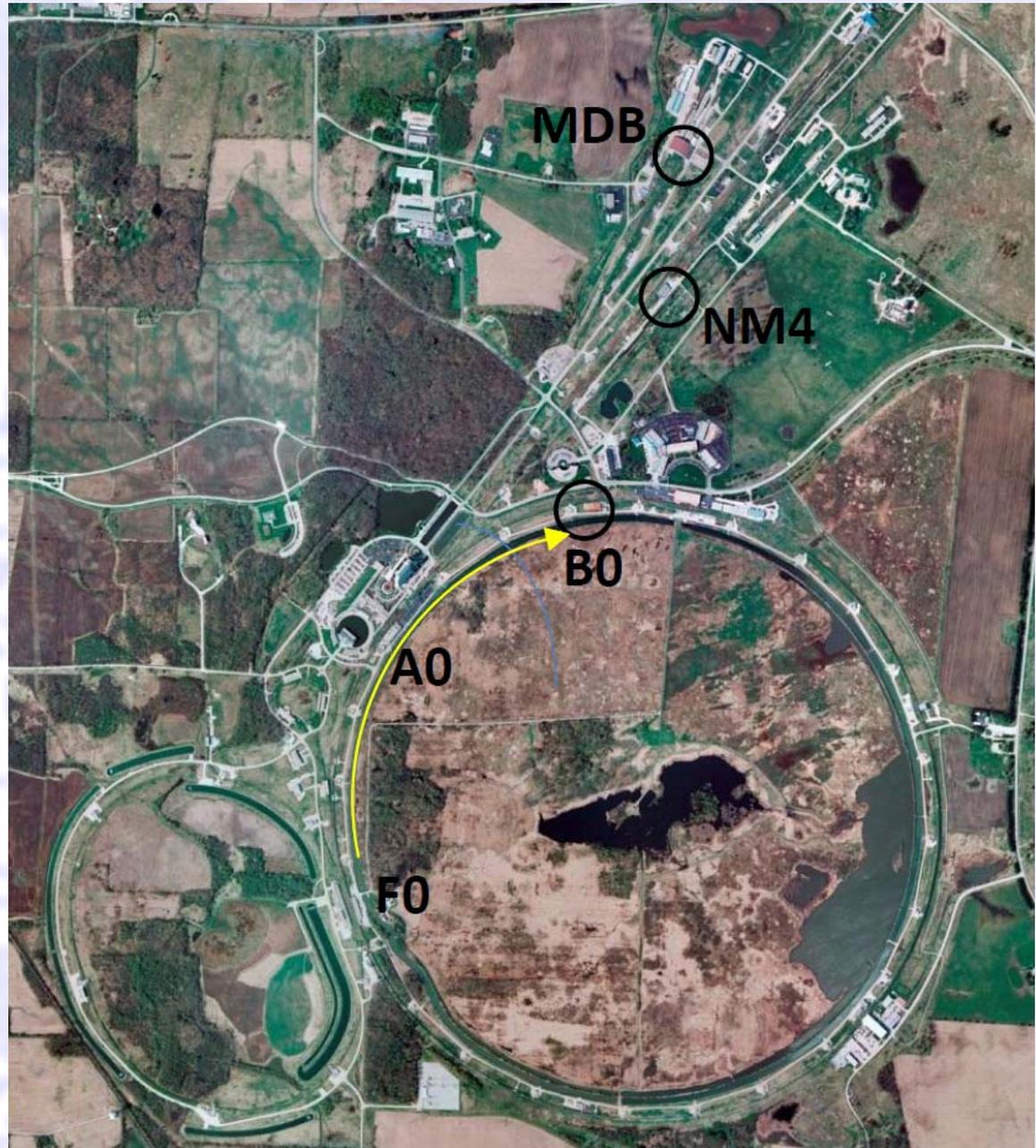


The ORKA new detector payload replaces the CDF tracker volume.



## Sites considered:

- B0:
  - Rad hard transport, need A0->B0 line.
  - Resident magnet & cryo
  - Infrastructure
- Sea-Quest/NM4/MDB:
  - Existing beam transport, but not rad-hard.
  - Infrastructure at NM4 but no cryo.



# B0 Assets for ORKA

- Siting ORKA in the B0 collision hall requires no civil construction. Shielding that can support 50kW of high energy proton beam exists from F0 to B0.
- Existing Solenoid, yoke, cryo, and magnet systems.
- Infrastructure. Experiment would live in the collision hall, but access to assembly hall infrastructure would be desirable. Cable bridge probably not required.
- Beam-line from A0 to B0 built from Main Ring magnets must be built. Possible common cause with the Proton Wakefield initiative that is interested in an experiment with Main Injector beam driving the low-beta quad system now at B0.
- The ORKA proposal will be submitted to Fermilab on Thursday November 10<sup>th</sup>. \$53M TPC, running in the later half of the decade.