

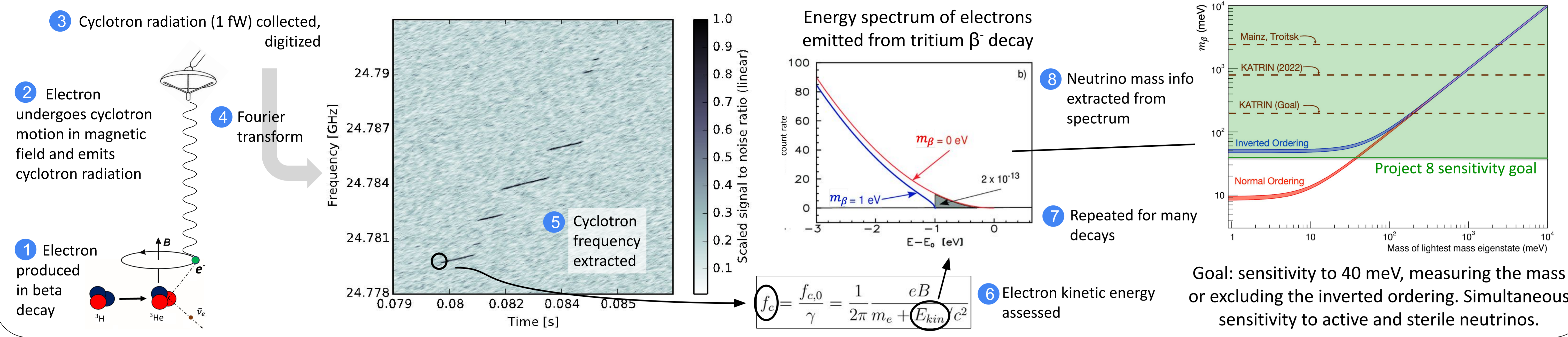
PROJECT 8

Low Frequency Apparatus for the Project 8 Experiment: a frontier direct kinematic neutrino mass experiment

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Project 8: measuring neutrino mass by observing tritium β^- decay with Cyclotron Radiation Emission Spectroscopy (CRES)



- #### Low-Frequency Apparatus (LFA) Goals
- Goal of **neutrino mass sensitivity comparable to KATRIN: $m_\beta \approx 0.3-0.7 \text{ eV}/c^2$**
 - The first experiment using an atomic tritium source!
 - Negligible background
 - Order-of-magnitude better sensitivity to relic neutrinos and light steriles

- #### LFA Specifications
- Long resonant-cavity detector for $\leq 300\text{-meV}$ resolution
 - Frequency: 560 MHz
 - Magnetic field: 0.02 T
 - Volume: 1.7 to 3 m³
 - Length: 5.5 to 10 m

- #### LFA Stages
- First stage: LFA
 - Test CRES detection with ^{83m}Kr and electron gun sources
 - Cool and trap atomic lithium in place of tritium
 - Second stage: LFA+
 - Integrate atomic tritium beamline
 - Perform the neutrino mass experiment

