

Laser Electron Gamma Source (LEGS)

Facility Properties:

Beam:

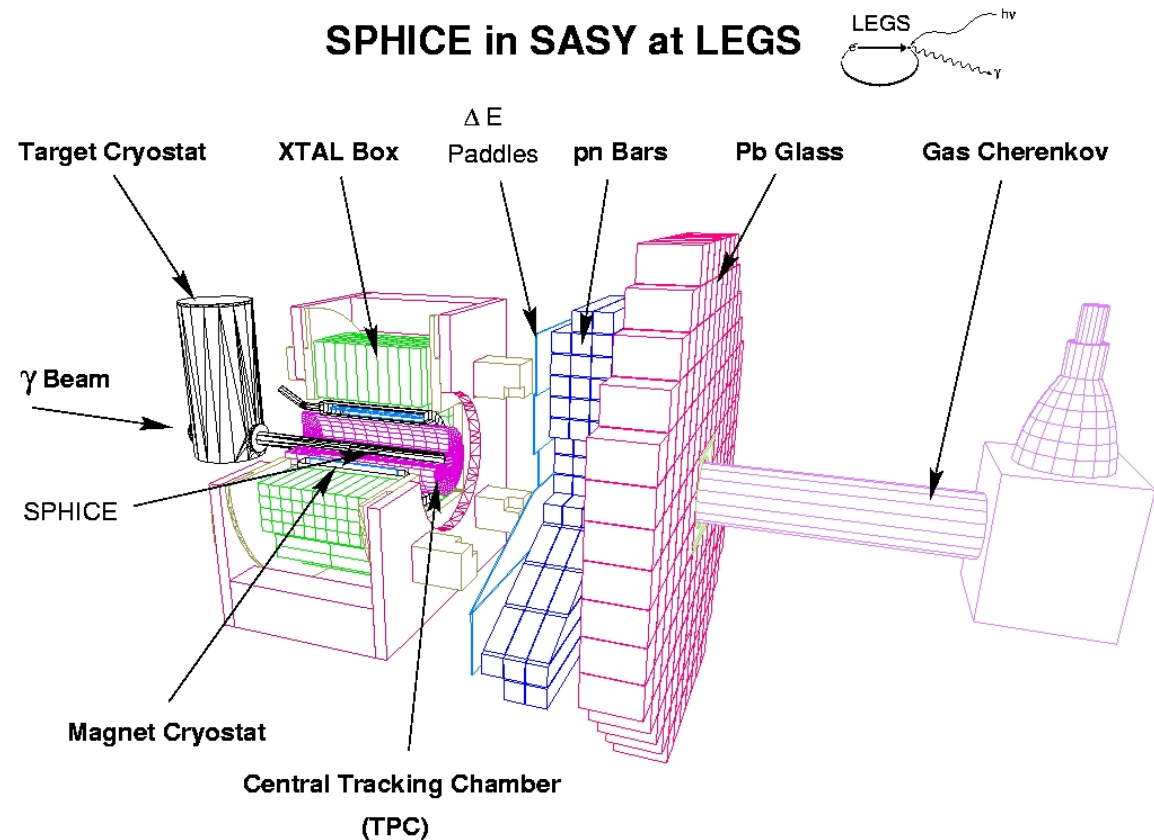
- $E_\gamma \leq 470 \text{ MeV}$
- $P_\gamma \rightarrow 100\%$
- P_γ precisely known
- P_γ rapidly variable
- $N_\gamma \approx 10^6 / s$

Detector:

- large acceptance
- charge tracking

Targets:

- HD !!



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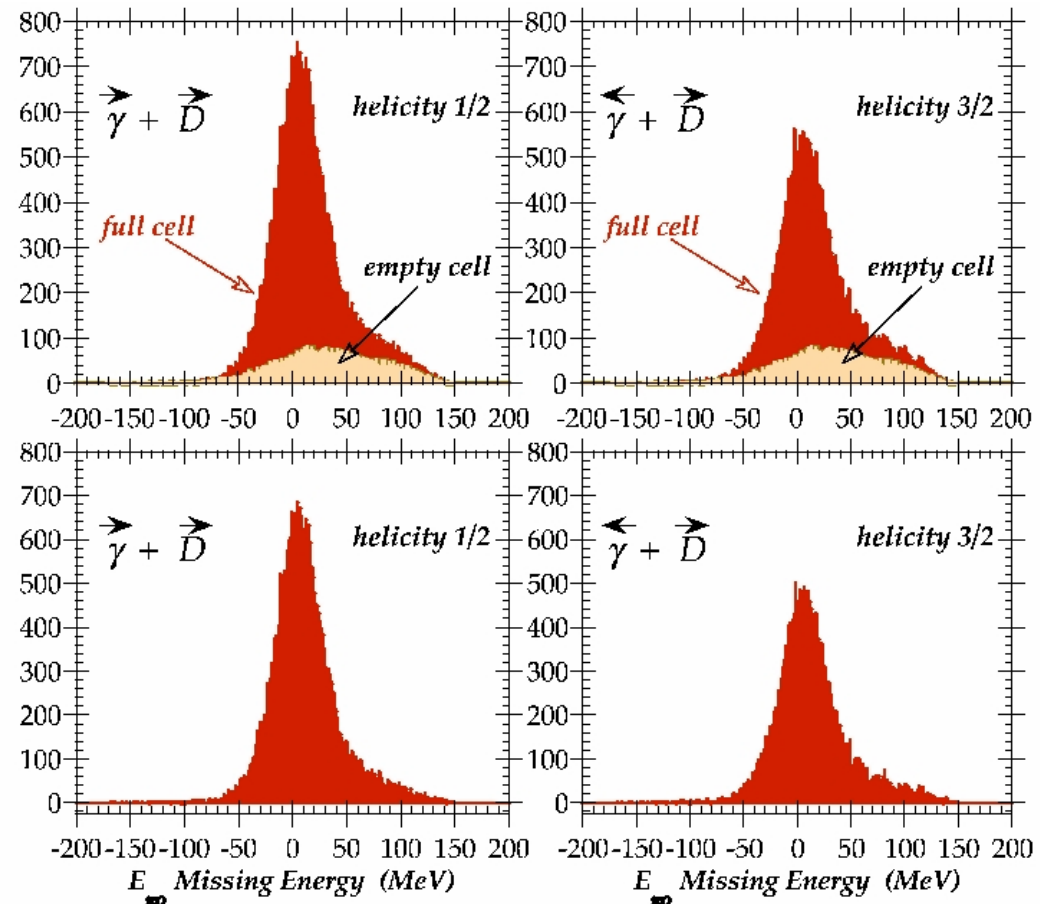
Recent History:

New capabilities:

- HD target developed
 - $|\vec{p}_p| \approx 65\%$
 - $|\vec{p}_d| \approx 35\%$
 - $\tau \rightarrow \infty$
 - \approx no other material
- TPC
 - GEM detector
 - ASIC readout

FOUR weeks running

- *Terminated 11/20/06*
- *10 months to analyze*
- *group to disband*



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1. Unique Physics Capabilities

2. GDH on "neutron;"
3. $\vec{p}(\vec{\gamma}, \gamma')$ - Compton \rightarrow spin polarizabilities;
4. $d(\vec{\gamma}, \vec{p})n$ - polarimeter from JLAB;
5. $p(\vec{\gamma}, \vec{p})\pi^0$ - polarimeter from JLAB;
6. ${}^3\text{He}(\vec{\gamma}, \vec{p}[d])$ - ditto, with Range Telescope;
7. ${}^4\text{He}(\vec{\gamma}, \vec{p}[{}^3\text{H}])$ - ditto, with RT; and
8. $d(\vec{\gamma}, \pi^+[n, \gamma])n$ - two-nucleon resonances.
9. ????????

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2. Component of US Electromagnetic Program

- HI $\vec{\gamma}$ S at $100\text{ MeV} \rightarrow \sim 180\text{ MeV}$
- ??????????
- JLAB $\rightarrow 12\text{ GeV}$

3. Significant investment in LEGS / HD / TPC

- Time to reap benefits
- Top priority of last Long Range Plan
Philosophy still sound

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4. Message to community / next generation

- **Group forewent experiments/publications (for non-permanent people, marketability) to develop transformational capability**
 - unique set of experiments
- **Succeeded!**
 - hitherto impossible experiments at LEGS
 - hitherto impractical experiments at JLAB
- **Result?**
 - **Program cancelled, some jobs ending 9/30/07**
 - **Relocate, start from scratch**