

AWA Facility Upgrade

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Background

- AWA Group has been receiving very positive DOE Review evaluations in the last several years.
- DOE funding has been constant or increasing, even in years with general budget cuts.
- Outstanding scientific results have been achieved in recent years using the unique AWA electron beam capabilities (100 MV/m accelerating gradient).
- General infrastructure in building 366 has improved in recent years (air-conditioner, better lighting, new laboratory space), creating a much better environment for conducting the AWA research program.
- Additional RF power station (a second klystron) is being commissioned and it will improve the capabilities of the facility.

Recent Budget Increase

- Very positive DOE review (Dec. 2008) and favorable DOE funding climate made possible an increase in the base funding of the AWA Group.
- Also, a one-time additional \$2M was awarded to the Group; this extra funding is meant to allow the purchase of two additional RF power stations and additional linac structures. The goal is to increase the AWA beam energy, further enhancing the capabilities of the facility.

Scope of the works

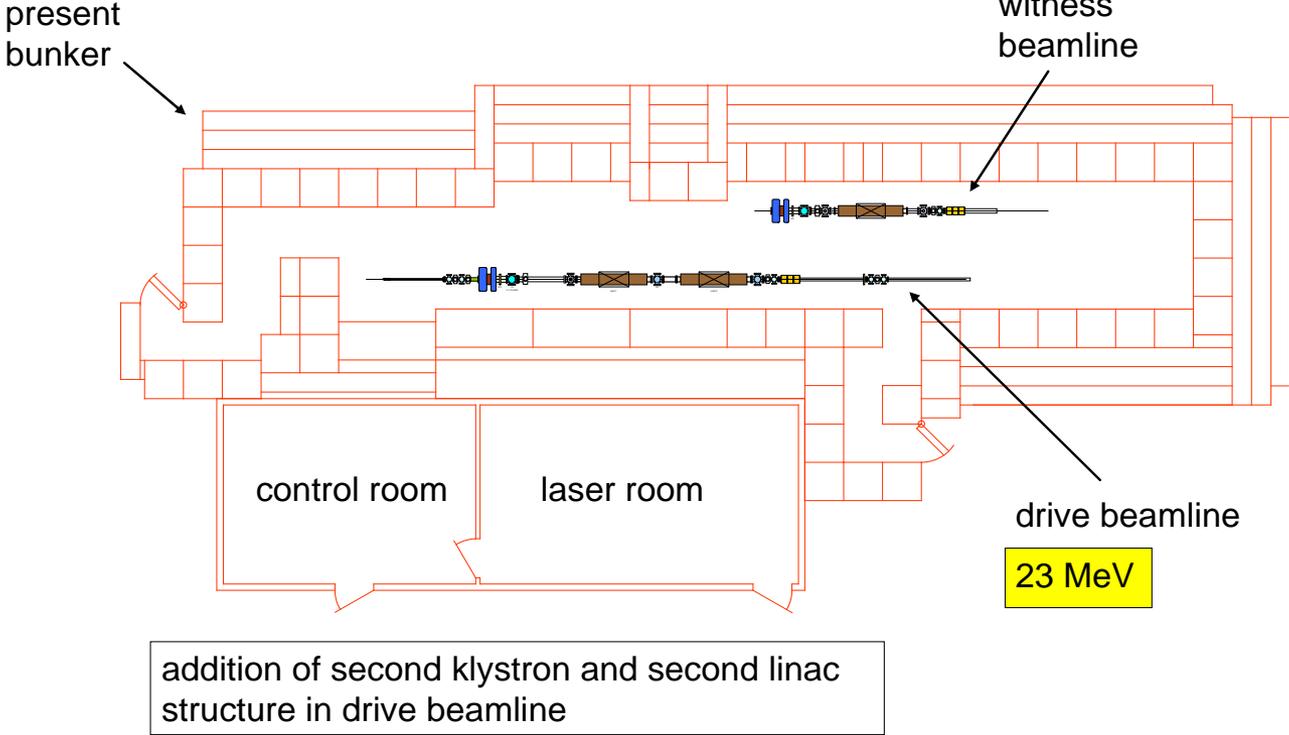
- 4 additional L-band Linac structures (50 MeV).
- Two RF stations (10 μ s, 25 MW each).
- A flexible experimental area for WF acceleration and other advanced accelerator concept experiments.

Need to Expand the AWA Vault

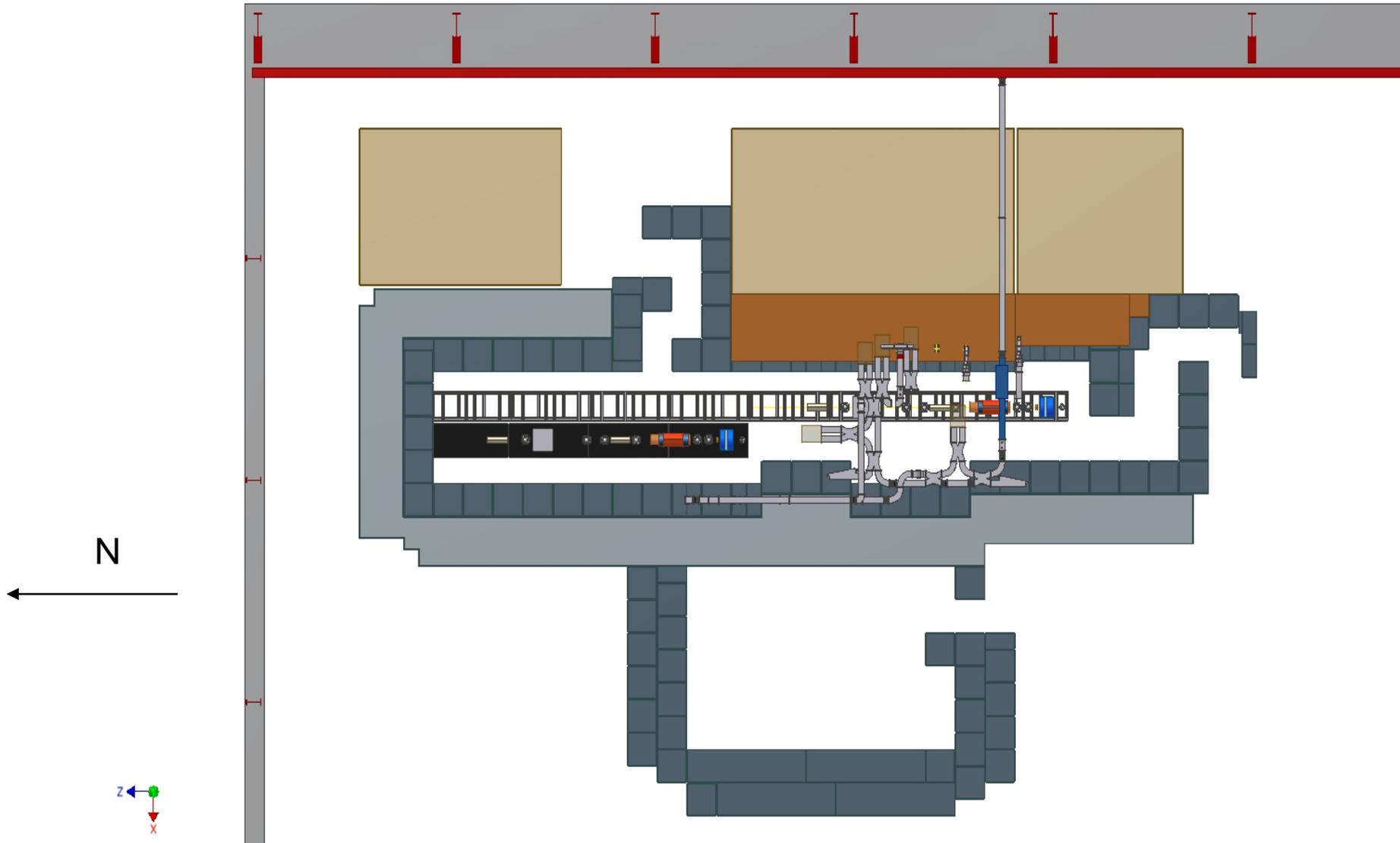
- In order to fully utilize the opportunity created by the recent increase in DOE funding, the AWA vault needs to be expanded.
- The AWA accelerator will be longer and cannot be sensibly housed in the existing vault.
- More space in the building is also needed for the installation of the two new RF power stations.
- Relocating the existing vault and accelerator would be very costly and prohibitively time consuming.
- Expanding the entire building would be very desirable but extremely expensive.
- A sensible approach would be to add an annex to the building, allowing the AWA vault to extend past the present building walls. This minimizes the facility downtime and allows the facility upgrades to occur in a timely fashion.

Current AWA Configuration and Near Term Plan

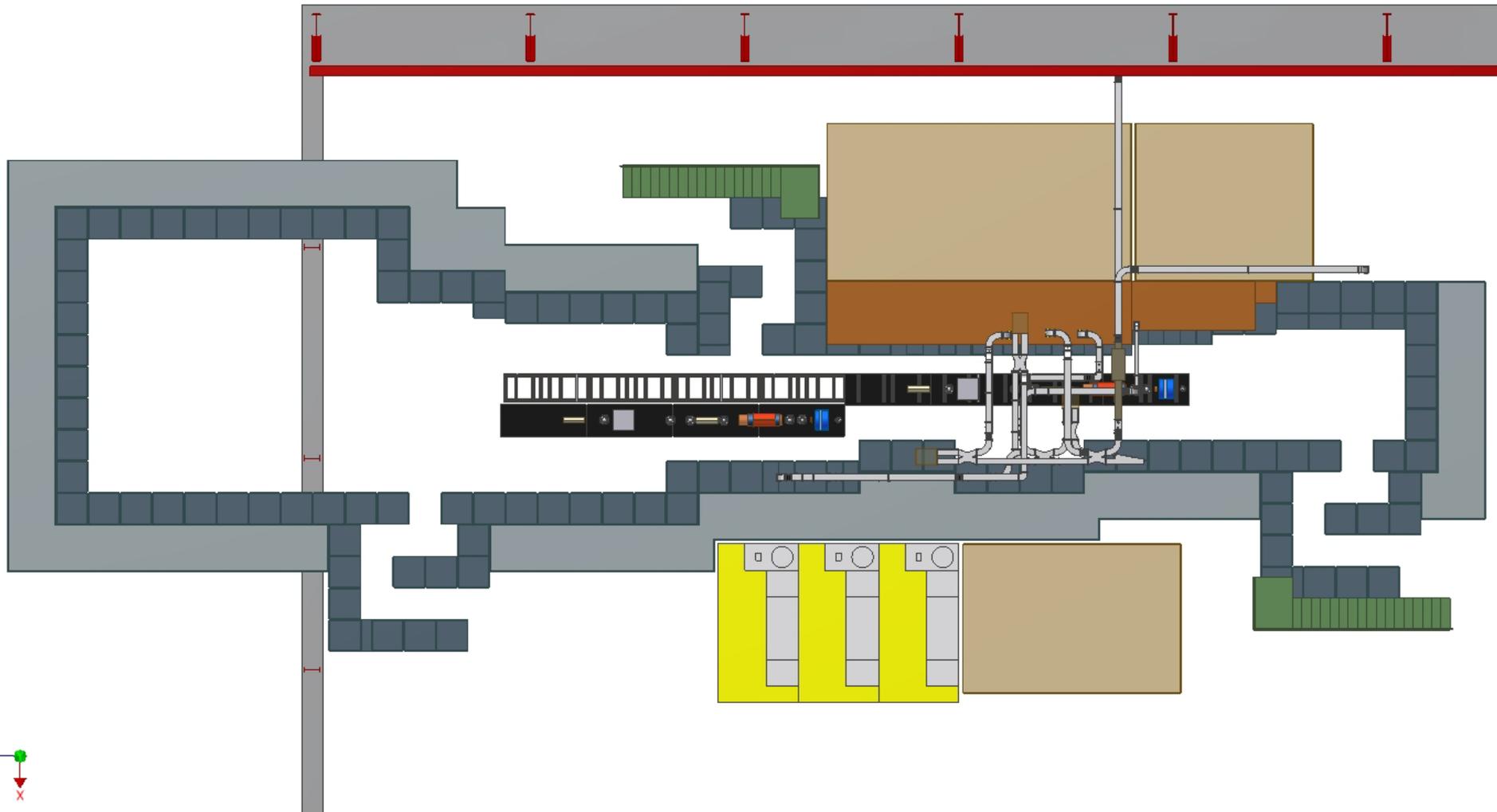
On-going Upgrades



Current AWA Upgrade Plan (from 15 MeV to 25 MeV)



Building 366 Expansion Plan



ANL ILC Positive Source Plan

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What we can do for ILC with increased funding

- We can do a detail study on the liquid metal target. Which includes the viability of the windows, liquid metal fluid dynamic under strong magnetic field, heat transfer, activation.
- With increased funding, we can do activation study on the target hall.
- Beam transport optics. A detailed studies on the beam optics has been stopped a year ago.
- We can refine the undulator numerical modal and improve the positron source end to end simulation.
- With increased funding, we can investigating the channeling positron production scheme