

FCPA/PPD/CD/AD review of the 21 cm R&D Initiative at Fermilab

The committee is charged with reviewing the progress of the R&D effort to develop a radio telescope experiment to make a 3-D map of 21 cm radiation from large red shifts in order to measure baryon acoustic oscillations and thus study dark energy. We request that the committee assess and summarize the principal scientific and technical merits and risks of this project, and its relationship to other projects in the field. Specifically, we would like the committee to evaluate:

1. Science reach

a) Is the science case strong and aligned with Fermilab goals? Is it likely to achieve 'mission need' at DOE?

b) Does this effort have a reasonable chance to achieve these science goals? Specifically, is there evidence that the problem of foreground subtraction can be surmounted?

c) What role will Fermilab have in extraction of the science? Are personnel identified that will play a major role in the science?

2. Technical approach

a) Is the 21cm survey competitive in reach, cost and schedule with other techniques proposed to study baryon acoustic oscillations? Specifically, how does it compare with other BAO efforts FNAL might consider (JDEM, BigBoss, LSST)?

b) Is the specific technique explored by the R&D effort at FNAL (cylindrical radio telescope array) the best approach to a 21 cm survey?

c) Assess the technical progress made to date. What resources were used and is the current technical status promising?

d) What is the expected technical role at FNAL? Does the lab have the required facilities and personnel to fulfill this role, or would we have to import radio astronomy expertise?

3. Collaboration and funding

a) Has a strong collaboration emerged, capable of mounting an experiment? What is the role of FNAL in this collaboration? Is there a project-oriented management structure being formed?

b) Has sufficient progress been made towards a conceptual design that a target date can be identified? Is the proposed schedule and budget reasonable for completing R&D and moving forward with a project?

c) What is the cost of such a project, and what are the planned funding sources? Is the cost estimate credible at this stage?

d) Has sufficient progress been made that this effort can go forward towards external review?

We ask that the committee provide a written report, with comments, findings and recommendations to FCPA within one week after the April 26 review.

