STANFORD UNIVERSITY

STANFORD LINEAR ACCELERATOR CENTER

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27 November 1979

Dr. G. Canavan
Office of Inertial Fusion
Department of Energy
Washington, D.C. 20545

Dear Greg:

I am enclosing a summary of the work of the Heavy Ion Accelerator Study Session which was held under the auspices of your office October 29, to November 9, in Berkeley. This summary was prepared by W.B. Herrmannsfeldt, who was chairman of the Organizing Committee of the Conference, from the reports of the heads of the various working groups at the Conference. This meeting was organized to bring together members of the world community of accelerator physicists to examine potential problem areas in the design of heavy ion drivers for inertial fusion. It is gratifying to note that these experts found no fatal flaws in the heavy ion drivers but, as you might expect, they did find some matters which needed further theoretical as well as experimental work.

After the formal end of this study session, I convened a meeting of some of the participants to discuss what they thought needed doing in the light of the work in the study session. Their first conclusion was that the pellet designers had gone too far in lowering the beam energy for heavy ion drivers to 5 GeV. This low energy makes space charge problems in these drivers much more severe than the old 20 GeV case. A good compromise for both the pellet design and the driver design will probably be about 10 GeV. The pellet designers should specify the energy, peak power, and beam radius required for a 10 GeV driver and the accelerator designers should then carry out new reference designs for the required systems. The next workshop in this series should concentrate on the review of these reference designs.

Four areas which needed more work were identified in this study. These are 1) final transport in vacuum with space charge; 2) longitudinal stability in induction linacs with emphasis on wave form tolerances; 3) longitudinal stability in storage rings; 4) longitudinal-transverse coupling in induction linacs which operate in an unusual mode with many transverse and few longitudinal oscillations during acceleration.

It was emphasized that the theoretical calculations are difficult and some estimate should be made of the possibility of scaled experiments using existing low and medium energy accelerators.

I think that this study session was very useful to the program and it gave me increased confidence that the work of the past few years had not overlooked any major problem areas.

Sincerely,

Burton Richter
Professor

BR:skd