ICANS XIV
14th Meeting of the International Collaboration on
Advanced Neutron Sources
June 14-19, 1998
Starved Rock Lodge, Utica, IL

Flow Study of JHF N-arena Liquid Target

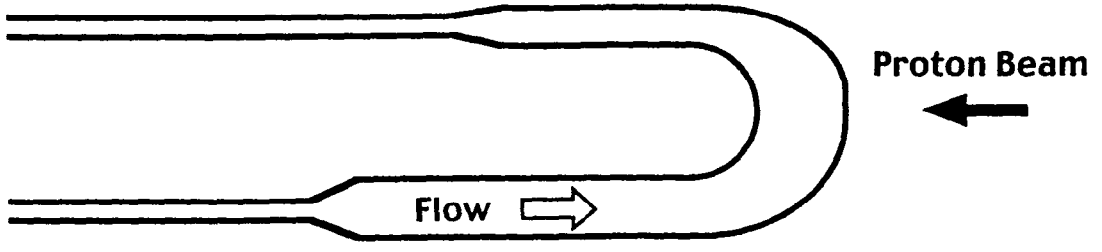
Jun Sakakibara[1], Takashi Ino[2], and Yasushi Takeda[3]

University of Tsukuba[1]
High Energy Accelerator Research Organization (KEK)[2]
Paul Scherrer Institute[3]

We have been studying the flow of water to design the JHF N-arena liquid metal target using a half size model, and we have found that a cross flow geometry, where the flow is at a right angle to the proton beam axis, is quite suitable for our mercury target design.

The flow was measured for three different test channels. Each had a 200 mm wide U-shaped part following the straight inlet section with a width of 70, 145, or 200 mm. The velocities of water in the U section with a 70 mm inlet were measured to be highest at the outside in the channel and became lower toward the inside while the other two showed the opposite tendency, higher velocities at the inside and lower at the outside. With a consideration of the target heat removal, the optimum channel width at the inlet section was estimated to be approximately 100 mm.

The Reynolds number at the U section of the model was about 1×10^5, one order smaller than the real mercury target. It, however, is considered that there are no significant differences in the time-averaged velocities between the model and the real since the turbulent flows in the channels are fully developed at such high velocities.



Cross flow geometry of the liquid metal target. The test channel was 200 mm wide on the proton beam axis and tapered down to 70 mm. The width in the straight inlet section was either 70, 145, or 200 mm.