

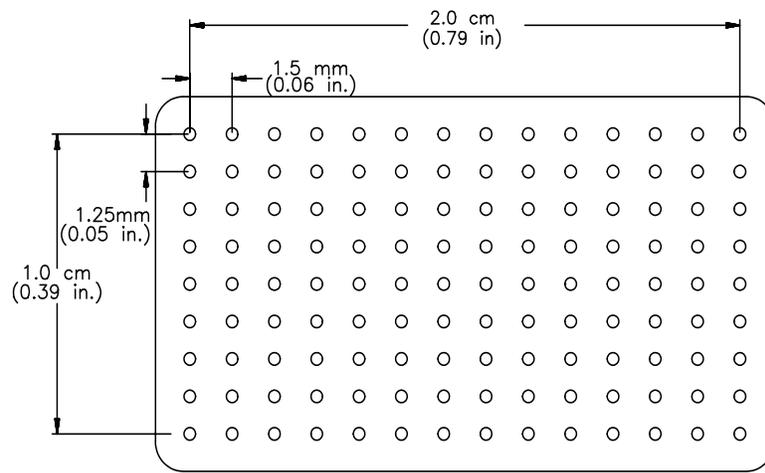
### **v. Beam Instrumentation**

The detector for the following diagnostic was installed. The readout system has not been completed and the system has never been commissioned.

Beam position information, both during normal running and during the abort cycle, will be provided by a standard BPM located approximately halfway between the kickers and the dump face.

An additional piece of instrumentation is being developed that will determine the extent, if any, of the ablation or cracking of the front face of the C-C absorber. Studies have shown that the beamlets will disperse as they travel through the absorber material, such that a cone-shaped path will be made in the C-C block. As the absorber face is lost, or if microscopic cracks form in it, the diameter of the spot emanating at the downstream end of the block will diminish.

To monitor the spot size an array of very small thermocouples (see Fig. 6-12) will be placed in the 2.5 cm (1 in.) gap that has been left immediately downstream of the C-C block housing. Since the position of the train formed by the 60 bunches will vary modestly along the horizontal axis due to the fine structure of the shape of the leading edge of the abort pulse, and also since the vertical position will be more stable, the array will be more dense in the vertical dimension than in the horizontal. The increased vertical resolution will allow for monitoring of the absorber face for abrupt failure, and through trending analysis will be capable of monitoring slow degradation of the material as well. The present design calls for 126 thermocouples, arranged in a 9 high by 14 wide array. The vertical spacing will be 1.25 mm while the horizontal spacing will be 1.5 mm, covering an area 1 cm high by 2 cm wide. Four off-the-shelf 32-channel signal conditioning boards will be utilized, the outputs of which will be sent to a standard RHIC MADC module. The size and shape of the array is easily altered if future conditions warrant, and doubling the number of monitoring points can be attained at a modest additional cost.



**Fig. 6-12.** Beam dump thermocouple array (spot size monitor).