Speckle Without The Pinhole

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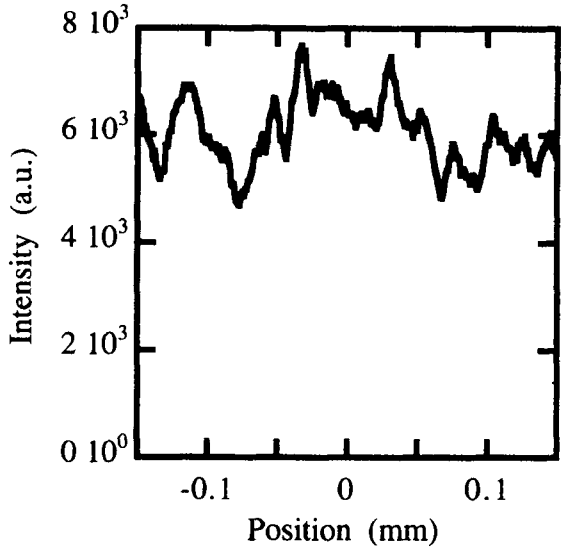
The purpose of this experiment was to see if speckle could be observed in the scattering from a random sample without using a coherent incident beam. The idea is that if one can limit the detector acceptance so that each point of the detector sees only one coherence length of the sample, then speckle should appear in the scattered beam. Bragg optics provide convenient collimation at the desired level, and thus the experimental arrangement was monochromatic radiation falling onto a powder sample followed by two Si (111) Bragg reflections, one in the horizontal and one in the vertical. A small pinhole was placed in front of the detector.



The desired speckle pattern was observed (see figure) and the experiment seems successful as a first attempt. However, detailed analysis has not been carried out due to other pressing responsibilities (the main proposer being responsible for the design and construction of a new beamline at SPring-8). Analysis is hoped to begin in earnest in the summer of 1999.