Structure design and analysis of SX-700 monochromator stray light diaphragm

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In order to prevent the 0 order light hitting the wall tube in synchrotron radiation beam line, the stray light diaphragm should completely block 0 order light based on that the front plane mirror and grating can independently rotate to the specified location in accordance with the input angle under the step scan mode of the monochromator. Therefore, whether the structure stray light diaphragm is reasonable directly affects the quality of light spot.

The entrance front diaphragm structure is designed with fixed entrance for the incident side and activity export for the exit side. The diaphragm group is constituted with two diaphragm and the aperture is 7mm×4.5mm, the length is 300mm, which is located before the monochromator by1205mm-1505mm from the grating shaft. The cooling water flows at 2 -5 L/min.

The export diaphragm choose four diaphragm to constitute the diaphragm group, the aperture is 6.5mm×7.5mm, length is 700mm. The diaphragm group is located after the monochromator by 547mm-1247mm from the grating shaft. The cooling water flows at 0.5 L/min. In order to ensure that the four diaphragms are in the same optical path, the 1 and 4 diaphragms are adjustable while the 2 and 3 diaphragms are fixed. Two-body structure is taken due to the connection length of the four diaphragms is 700mm, 2 and 3 diaphragms are fixed with a square support flange while 1 and 4 diaphragms adopt adjustable plate.

The experimental results meet the design requirements that the 0 order light is completely blocked, and the performance is stable and reliable.

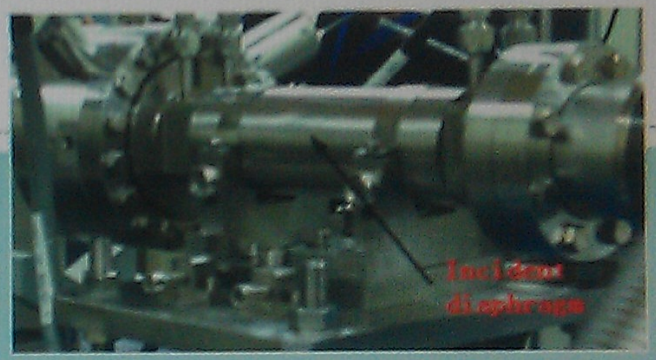

Photo of incident diaphragm

Photo of exit diaphragm