

A Compact Liquid Sample Automatic Handling System for Remote BioSAXS Operation

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To meet the increasing request on the BioSAXS measurements, a compact liquid sample automatic handling system has been built at beamline 12-ID-B of APS for high throughput measurements. This autosampler can take up to six 96-well plates or ninety 0.5ml Eppendorf tubes at one time. 96-well plates and Eppendorf tubes are switchable or mixing used. A friendly python-based GUI program has been written to control the autosampler and associated syringe pump. The program allows flexible pump operations, easy switching between 96-well plate and Eppendorf tube configuration, automatic flow cell washing, and flexible sample running sequence. This system works for biological samples and other liquid samples, both for room temperature and varied temperature studies. The 96-well plates only configuration is suitable for remote operation as it could run a few hundred samples continuously for 2-3 days without opening the experimental hutch. This autosampler has been successfully used for mail-in and remote operations in the past two years.