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Recent developments of pyrolytic graphite monochromators

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The application of HOPG (highly oriented pyrolytic graphite) as an efficient monochromator and filter material for neutron instrumentation has been discovered more than 50 years ago. Despite the fact that HOPG has been in use for such a long time, there is still room for improvements regarding its implementation in neutron beam optics. The features of a novel concept called POSI (pyrolytic-graphite-on-silicon) based on careful x-ray characterization of the HOPG crystals and proven technology show that the efficiency of HOPG monochromators can be increased while decreasing complexity and cost. Moreover, by combining HOPG and bent perfect silicon crystals the functionality of monochromator and analyzer systems is expanded from separate single devices to dual systems or bichromators augmenting the potential of experimental applications. The presentation will include a review of the state of the art, recent results obtained with mechanical tests, x-ray and neutron diffractometry of POSI systems and an outlook on future perspectives.

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