

High-speed x-ray full-field imaging applications at the APS*

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The availability of x-ray sources such as the Advanced Photon Source (APS), with very bright beam, wide energy tunability and flexible storage ring filling structure, allows to push the limits on the speed of the traditional full-field phase-contrast imaging in terms of exposure time and repetition rate. We are currently limited by the state of the art of the high-speed digital cameras technology. We will present some examples of studies done with exposure time down to 100 ps and repetition rate up to ~ 0.5 million fps. These include fluid dynamics singularities [1, 2], fuel injector inner dynamics [3], and materials science applications such as rapid reactions propagation [4]. Limitations and future developments will also be discussed.

References:

- [1]. Wang Y. et al. PRL. 100, 154502 (2008).
- [2]. Fezzaa K. et al. PRL. 100, 104501 (2008).
- [3]. Wang Y. et al. Nature Physics 4, 305 - 309 (2008).
- [4]. Reeves R.V. et al. PRB. 80, 224103 (2009).

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