

Transitions in matter induced by intense X-ray radiation and their diagnostics.

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X-ray induced structural transitions in solids are in focus of this talk. Depending on the dose absorbed, an irradiation with a femtosecond X-ray pulse can trigger an ultrafast electronic or structural transition in solid materials. In magnetic materials, an X-ray triggered ultrafast demagnetization can also occur. In this talk, selected study cases [1-9] for these transitions are presented. Dedicated theoretical modeling reveals complex multistage evolution of the irradiated systems, confirmed by experimental measurements performed at FERMI and at other XFEL facilities. Challenges remaining for the modeling and quest for further improvements of the necessary diagnostics tools are discussed.

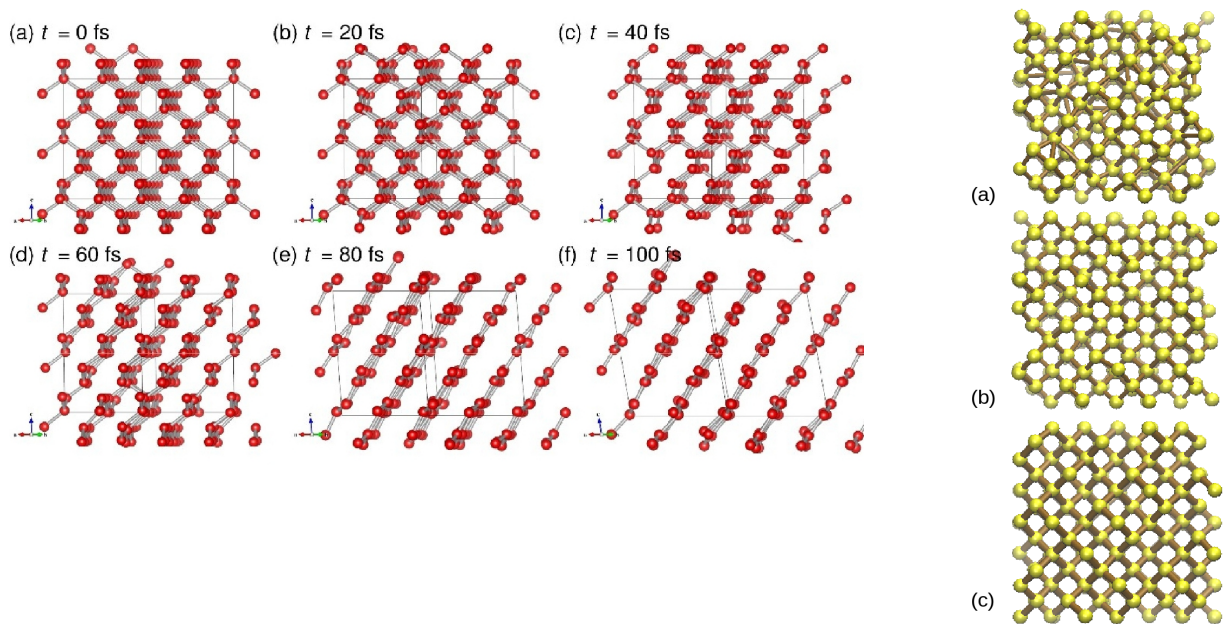


Fig. 1 Ultrafast graphitization of diamond triggered by soft X-ray pulse of 10 fs duration (left) & dose-dependent structural changes in silicon crystal triggered by hard X-ray pulse of 25 fs duration (right)

References

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