Some potential High Energy Density Physics experiments using synchrotron radiation

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When interacting with matter, high-power lasers can produce plasmas with the highest macroscopic energy density that can be obtained in the laboratory. Such plasmas can also exhibit the most extreme values of other quantities, notably pressure, density, velocity, velocity gradient and acceleration. In this talk the author will describe experiments undertaken to date that investigate plasmas under these extreme conditions and indicate where future experiments could use of synchrotron radiation to probe those plasmas. The potential benefits of synchrotron radiation over the sources currently used will be described.