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Medical X-ray sources now and for the future

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- Despite of great effort to invent and develop alternatives, vacuum electronics based bremsstrahlung sources in the form of X-ray tubes are expected to remain the workhorses for medical diagnostic imaging for the years, probably the decades, to come.
  - They will further be improved with respect to compactness, versatility, reliability and costs. Novel sub-components and X-ray segments are in development for better X-ray systems.
  - Liquid metal jet bremsstrahlung sources, switchable distributed bremsstrahlung sources and similar concepts, will certainly occupy niches. Examples are propagation based differential phase contrast imaging, and high resolution imaging of ex-vivo material.
  - Unfortunately, other highly brilliant sources, free electron lasers, synchrotron-undulator sources, laser-based inverse Compton scatter sources are not yet commercially viable and lack robustness for the clinical setting. Their important primary fields of application seem restricted to extraordinary sophisticated experiments of basic research outside of the rugged clinical routine of human imaging.

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