AbstractID: 8534 Title: High Power Monochromatic X-Ray Source Development

Monochromatic x-ray sources have several advantages over standard tubes. Most importantly, they can improve sensitivity to contrast agents while lowering patient radiation dose. Science Research Laboratory, Inc. is involved in a program to develop an x-ray tube that uses rare-earth coatings for such purposes. Such a source may be coupled to a monochromator or may be used in conjunction with x-ray filters in order to produce a useful spectrum. The key technologies are the coatings themselves, which must be made to withstand high power for many cycles yielding an acceptable lifetime. Recent efforts have resulted in the development of a coating based on erbium ($K_{\alpha 1}$ = 48.2keV). This coating has been subjected to numerous exposures of 230kW/cm^2 at 100keV at a track speed of 3300cm/sec. No degradation of x-ray production was observed from these exposures indicating that higher loadings may be feasible. The track speed can also be increased by a factor of 2-3 allowing for an equivalent power increase. Details of these results will be presented, along with a comparison to other (more exotic) sources and a discussion of applications, including Dual-Energy Angiography. Work supported by Science Research Laboratory, Inc.