Abstract Submitted
for the FWS15 Meeting of
The American Physical Society

Microbeam performance measurements of an integrated x-ray tube and polycapillary x-ray lens system for medical x-ray fluorescence research MIHAI GHERASE, ANDRES FELIPE VARGAS, California State University, Fresno — Research and development of polycapillary x-ray lenses (PXLs) in the past few decades have significantly improved the performance of x-ray tube-based devices intended for x-ray diffraction (XRD) and x-ray fluorescence (XRF) applications. PXLs are bundled micron-size glass capillaries that guide x-ray photons. Focusing capabilities of PXLs can augment the photon fluence rate of x-ray beams by a few orders of magnitude. PXLs work on the basis of the total x-ray reflection mechanism in which the x-ray photon reflects on a surface for incident angles below a critical angle. The critical angle is inverse proportional to the x-ray photon energy. Therefore, the optical parameters of PXLs are energy-dependent. In this study size measurements of an x-ray beam produced by an integrated polycapillary x-ray lens and x-ray tube system were performed using a scanning x-ray fluorescence method with three different thin metallic wires. The proposed method is useful in XRF applications for which the effective x-ray beam size for elemental detection is required.

Mihai Gherase
California State University, Fresno

Date submitted: 22 Sep 2015 Electronic form version 1.4