AbstractID: 7136 Title: Study of the Luminescence from an Imaging Plate

Brachytherapy sources such as radioactive stents and catheter-based systems are becoming a popular way of treatment for artery disease. Imaging plates commonly used for computed radiography and bio imaging represent a possible tool for measuring the dose distribution for this kind of sources.
Measurements at the National Institute of Standard and Technology (NIST) were conducted for several beta-particle reference fields, where it was found that their response was linear in the range of 10μGy-10mGy, also measurements of stent dose distributions proved a much faster response for an imaging plate than radiochromic films.

These imaging plates contain a phosphorous layer of BaFBrEu2+, which is a photostimulable material. In the last years, there have been some controversies concerning the exact mechanisms by which after exposed to x-rays, they emit the luminescence characteristic from the recombination of the electrons with the Eu2+ centers. Recently it has been found that longer wavelengths than expected also produce luminescence, meaning that there are other meta-stable states closer to the conduction band than the states associated with the so called F-centers. If these new states could be de-populated prior the reading, the stored image would be much more stable reducing the fading overtime making it a better tool for measuring dose. Measurements of the spectra of the luminescence are being done using a PMT attached to a 0.3m scanning monochromator and different pulsed laser lights are used to de-populate the states.