

We investigate the use of the relative ionization data detected by an electronic portal imaging device (EPID) to confirm patient setup. The ultimate goal of an EPID is to detect quickly and automatically a setup variation from transmitted x-rays. Previous work has showed that relative ionization can be used to determine setup variation and tissue thickness. An algorithm has been developed to combine these measurements. This algorithm searches to minimize the relative ionization difference between two EPID images by translations and inplane rotations. The score derived from this search can also be used to detect the presence or absence of ancillary devices in the images. Several phantom studies were performed to assess the effectiveness of the algorithm and to characterize its results. Materials such as scissors (for high contrast) and head and torso phantoms were imaged in several different configurations with and without ancillary devices in the beam. The images were then fed into the algorithm and compared to a standard image. Scoring thresholds were then determined to indicate the presence or absence of various ancillary devices. This algorithm shows promise as an automatic method to verify both patient and treatment field setup.