AbstractID: 7340 Title: Characterization and Minimization of Geometric Distortions in MR Imaging

Magnetic resonance imaging (MRI) is the modality of choice for the detection and evaluation of soft tissue lesions. Therefore, MRI is being used with increasing frequency in the planning of radiation therapy procedures, *e.g.*, stereotactic radiosurgery and IMRT, as well as in the guidance of invasive procedures, *e.g.*, stereotactic biopsies. Furthermore, MRI data are now being used to actually guide interventional procedures while the patient is in the scanner. Before such MR-guided treatment planning procedures are undertaken, however, it is critical to understand the wide range of intrinsic and extrinsic parameters that affect the spatial accuracy of MR image data. An understanding of such parameters will allow the clinical medical physicist to assist in choosing appropriate image acquisition techniques and acquisition parameters that will provide optimal spatial accuracy of the resulting images, and will allow the implementation of appropriate quality assurance programs. This course will review the primary sources of geometric distortion in MR images and present techniques for minimizing such distortions.

Educational Objectives:
To review the primary causes of geometric distortion in MR imaging and discuss acquisition strategies that will minimize such distortions.

Upon completion of this course, the participant will be prepared to:
1. Understand the physical basis of geometric distortions in MR images due to system design and calibration as well as patient-induced distortions.
2. Understand the impact of pulse sequence parameter selections on the spatial accuracy of the resulting MR images.
3. Understand and implement key aspects of a quality assurance program for sites that use MR data in treatment planning procedures.