AbstractID: 12019 Title: New Dosimetry Measurements - New Developments

Image-guided intensity modulated radiation therapy deliveries are becoming increasingly complex and their verification involves dosimetry measurements in situations that are no longer covered by reference dosimetry protocols or relative dosimetry procedures with simple corrections. These beams are generated as part of intensity modulation (IMRT), stereotactic radiosurgery (SRS), cyber-knife and gamma-knife deliveries and involve the use of extremely small fields in order of few millimeters. In this era of joint imaging-therapy developments, accurate dosimetry techniques are sometimes trivialized and important effects not understood or ignored.

This presentation consists of three parts: the first part revisits the guiding principles of measurement dosimetry in standard and nonstandard conditions, definitions of detectors and phantoms, reference dosimetry of conventional beams and also discusses the new developments in reference dosimetry of nonstandard beams. The second part of the presentation concentrates on practical aspects of relative dose measurements with the goal to generate 3D distributions as well as integrated measurements and derived quantities. The third part concentrates on a discussion of relative dosimetry in narrow fields and deals with the choices of possible radiation detectors, the difficulties and possible solutions to measurements in disequilibrium situations created by this era's narrow photon fields.

Educational Objectives

1. To understand the principles of clinical measurement dosimetry and applicability to standard and nonstandard beams;
2. To understand standard clinical reference dosimetry techniques and be exposed to some of the new developments in reference dosimetry in nonstandard beam configurations;
3. To get an overview of practical aspects of relative dosimetry techniques for the purpose of 3D dose distributions in standard fields, small photon fields and buil-up regions;
4. To be aware of the complications of measurements and detector choices in electronic disequilibrium situations created by small photon fields.