

## AbstractID: 3157 Title: Toward an Energy-Based Dosimetry

**Purpose:** To present a methodology for energy-based dosimetry for brachytherapy sources

**Method and Materials:** Methodology for brachytherapy dosimetry is based on TG 43 formalism. For low - dose rate low-energy brachytherapy sources, TG-43 involves a measurement of the air-kerma strength traceable to NIST using the Wide Angle Free Air Chamber (WAFAC). A Variable Aperture Free Air Chamber (VAFAC) has been constructed for making air-kerma rate measurements with various solid angles. Both instruments provide a determination of the air-kerma strength. In addition, spectra of these seeds can be measured both in air and liquid water by an intrinsic germanium spectrometer. We have also recently measured the total energy contained and emitted from various sources using a novel cryogenic calorimeter. This provides an absolute measurement of the power of the source. Each of these experimental processes is presented in other papers. This talk is an overview of how these measurements can be combined to yield an energy-based dosimetry process. These measurements provide a good basis for Monte Carlo calculations. The energy standard would be used for calculation of dose or by extension, energy deposited. However, with extension to energy-based dosimetry, a modification of treatment planning systems for a gradual shift from TG 43 formalism will be necessary. An energy-based dosimetric formalism involves knowing the contained energy or the total emitted energy of a brachytherapy source. A review of the present dosimetry with an extension to energy-based dosimetry will be presented for discussion.

**Results:** It is shown that energy-based dosimetry is feasible. The experimental parameters necessary are presented and are being measured presently. The results are very promising.

**Conclusion:** This dosimetry schema is feasible and may be the dosimetry of the future. Moreover, this methodology provides an efficient platform upon which to base Monte Carlo dosimetry calculations.