Micro-dosimetry study of the radiation dose enhancement at the gold-tissue interface for nanoparticle-aided radiation therapy (Supporting Document)

**Purpose**- Purpose of this study is to develop a micro-dosimetry technique in order to study the dose deposition in micro-scale range.

**Material and Method**- Dose enhancement near the gold foils of 1 µm, 10 µm and 100 µm and areas of 12.5x25mm² placed at short distance from clinical HDR brachytherapy (Ir-192) source were obtained with Monte Carlo N-Particle code (MCNP5) in one dimensional approach. To verify the simulated results a preliminary experiment was conducted in which CdTe photodetector of thickness less than 10 µm was placed in front of the gold foil separated by few hundred microns of tissue-equivalent plastic so that the detector was in between the source and the gold foil. For reference measurement an exact same arrangement was made without the Au foil. The dose deposited with and without Au foil was measured as output voltage of the photodetector, working in photovoltaic mode.

**Results and Discussions**- The simulated data for dose enhancement are plotted in figures 1, 2 and 3. An example of experimental data for 100µm thick gold is also shown in the figure 3.

The comparison between the experimental and simulated data in figure 3 demonstrates a close agreement between, validating the experimental approach. The results for 10 and 1 µm thick gold foils will also be presented.

**Conclusions**- Our results demonstrate the possibility of the use of a thin-film CdTe photodetector for micro-dosimetry verifications near gold-tissue interface.