

# X-ray machine spectrometry for dosimetry

Knowledge of the spectrum of an X-ray quality is a great advantage and allows calculation of different coefficients for the quality. These are especially important at low energies. With the spectrum, you can calculate, for example, the attenuation in air and conversion coefficients from air-kerma to dose-equivalent.

The first part of the webinar introduces the method of measuring an X-ray spectrum with a spectrometer. The presentation gives a basic idea of the measurement setup and the unfolding procedure needed to convert the measured spectrum into fluence spectrum. Furthermore, different applications of the spectrum are discussed. Even though the topic is presented mostly from X-ray measurement point of view, the same method can be used for example to determine conversion coefficients for americium sources.

Another part of the webinar is about spectrum simulation, and the python based tool SpekPy. SpekPy gives an accurate estimation of spectra when measurement is not possible, also with clinical machines. The physics behind the software, its use, and its limitations are discussed in the presentation.



**Joonas Tikkanen** is a scientist at the Radiation and Nuclear Safety Authority of Finland (STUK). His research has focused mostly on improvements in patient dosimetry, and as a part of his work, he has determined experimentally the spectra for X-ray qualities at STUK.



**Gavin Poludniowski** is a physicist employed at the Karolinska University Hospital in Sweden. He has been involved in modelling x-ray tubes for a decade-and-a-half and his research work has led to software tools such as SpekCalc and SpekPy.