AbstractID: 7887 Title: Advanced Techniques for Image Quality Assessment in Digital Radiography

Until recently, advanced image quality metrics such as the frequency-dependent detective quantum efficiency, DQE (f), have been employed by a relatively small cadre of expert imaging scientists to compare the performance of digital radiography systems, often using differing methods. To address the potential for differences in measured DQE(f) arising from differences in test methodology, in 2003 the International Electro-technical Commission (IEC) published the first in a series of performance standards to define techniques for measuring the DQE(f) and its constitutent metrics, the modulation transfer function, MTF(f), and noise power spectrum, NPS(f). More recently, the increasing prevalence of digital radiographic systems in the clinical environment and availability of both commercial and public-domain resources have made DQE(f) evaluations both more accessible and increasingly relevant to the clinical medical physicist. This course will review the measurement and analysis methods for DQE evaluations of both general digital radiography and digital mammography systems, using the relevant IEC standard method as a guide.

Learning Objectives:

1. Review the definition of the DQE(f) and its constitutent metrics the MTF(f) and NPS(f).

2. Gain an understanding of the IEC standard method for measuring detective quantum efficiency, for both general digital radiography and digital mammography imaging systems.

3. Learn which commercial and public-domain resources are available for measuring the DQE(f) of digital radiographic imaging systems.