

ABSTRACT

METHODS AND APPARATUS FOR NORMALIZING OPTICAL EMISSION SPECTRA

An arrangement for in-situ optical interrogation of plasma emission to quantitatively measure normalized optical emission spectra in a plasma chamber is provided. The arrangement includes a flash lamp and a set of quartz windows. The arrangement also includes a plurality of collimated optical assemblies, which is optically coupled to the set of quartz windows. The arrangement further includes a plurality of fiber optic bundles, which comprises at least an illumination fiber optic bundle, a collection fiber optic bundle, and a reference fiber optic bundle. The arrangement more over includes a multi-channel spectrometer, which is configured with at least a signal channel and a reference channel. The signal channel is optically coupled to at least the flash lamp, the set of quartz windows, the set of collimated optical assemblies, the illuminated fiber optic bundle, and the collection fiber optic bundle to measure a first signal.

FIG. 1