

## Concentration measurements of bubbles in a water column using an optical tomography system

### Abstract

Optical tomography provides a means for the determination of the spatial distribution of materials with different optical density in a volume by non-intrusive means. This paper presents results of concentration measurements of gas bubbles in a water column using an optical tomography system. A hydraulic flow rig is used to generate vertical air–water two-phase flows with controllable bubble flow rate. Two approaches are investigated. The first aims to obtain an average gas concentration at the measurement section, the second aims to obtain a gas distribution profile by using tomographic imaging. A hybrid back-projection algorithm is used to calculate concentration profiles from measured sensor values to provide a tomographic image of the measurement cross-section. The algorithm combines the characteristic of an optical sensor as a hard field sensor and the linear back projection algorithm.