

# Choice of the detectors for light impurities plasma studies at W7-X using ‘C/O Monitor’ system

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‘C/O monitor’ system is a specially dedicated spectrometer for Wendelstein 7-X, which is planned to be installed before the second Operational Phase (OP 2). It will be a high throughput and high time resolution system which will be able to monitor the main low-Z impurities in the plasma. It will be fixed at nearly horizontal position for the observation of Lyman-alpha of H-like ions of carbon (3.4 nm), oxygen (1.9 nm), boron (4.9 nm) and nitrogen (2.5 nm).

In order to measure emission of these elements, the proper selection of detectors is needed. Several options for CO monitor system at W7-X have been considered. One of them was multistrip gaseous chamber, which is already applied in the spectrometer monitoring oxygen and carbon lines at ASDEX-U experiment. Another possibility was to use the gas electron multiplier (GEM) detector, which technology has been intensively developed through last few years. Microchannel plates in combination with luminescent phosphor and a set of Photodiodes have been also taken into consideration. Mentioned types of detectors were used in similar spectrometers installed on the plasma devices, however this solution introduces unnecessary complication. In the first phases of W7-X operation, when the hydrogen is used as a working gas, the CCD camera has been proposed. Nevertheless, the spectrometer is designed in a such way, that it will be possible to adapt other detecting system in the latter phase of operation. For this reason, GEM or multistrip-like detectors are considered, especially when the deuterium will be used. In this contribution the differences between detectors and the possibility of their application in the term of their future use in ‘C/O monitor’ for W7-X will be thoroughly discussed.