FLASH2020+ project: New challenges for photon diagnostics

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The FLASH2020+ project, a major upgrade program for the high repetition rate XUV and soft X-ray free-electron laser FLASH at DESY, aims at significantly improving the FEL photon beam properties for users. Within the project, both existing FEL lines at FLASH will be equipped with fully tunable undulators capable of delivering photon pulses with variable polarization. One of the two FEL lines will be externally seeded at the full repetition rate that FLASH can provide in burst mode. The other line will exploit novel lasing concepts based on different undulator configurations. Together with an increase in electron beam energy to 1.35 GeV this will extend the wavelength range to the oxygen K-edge in the fundamental harmonic, in order to cover the important elemental resonances for energy research and the entire water window for biological questions. The planned machine upgrade and the resulting new beam properties require a substantial upgrade of the existing photon diagnostics and beam transport. Some initial ideas and concepts to address these new challenges will be presented.