In an X-ray diffraction experiment, is the wavelength of the incident and the diffracted beam the same

The wavelength of the beam is related to the energy of the photons. In diffraction, the energy of the incoming beam is very very close to the energy of the diffracted beam. We call this phenomenon **elastic scattering** in opposition to **inelastic scattering** where some energy is absorbed by the system and the energy of the diffracted beam is less energetic.

For all practical purposes, in diffraction, we can consider that no change occurs to the wavelength of the incoming and diffracted beams.