Coherent matter-wave optics is still a very young field, far less developed and more complex than conventional optics for light. This field represents an emerging area of science, quantum engineering, with a high potential for a future technology and multidisciplinary applications.

Thanks to an impressive evolution and remarkable inventions, the ultimate potential of matter-wave sensors is entirely open. For the closely related field of atomic clocks, the growth in performance was exponential during the last decades! This is the reason why matter-wave sensors are considered as one of the most promising fields to progress in metrology and fundamental tests. On the other hand, it is still an open question, if quantum engineering will once become a technology with major applications (beyond clocks) in every day life. Inertial quantum sensors provide a new tool for the precise detection of faint forces and tiny rotations. According to the principle of these sensors, the measured physical quantity will be converted into a frequency, which can be measured with highest accuracy (nowadays, time and frequency standards are the most precise standards).

The outstanding feature of these sensors is the precisely known scaling factor: there is no need for calibration, which predestines these sensors for inertial references and for applications for the Système International.