The European Synchrotron Radiation Facility (ESRF) has developed a programme for a new storage ring based synchrotron X-ray source which will qualitatively improve today’s performances thanks to a drastic reduction of the electron horizontal equilibrium emittance. X-ray beam parameters will improve by approximately two order of magnitude in terms of brilliance and coherence, and new scientific reach will be enabled in particular in X-ray imaging, microscopy and small beam applications.

This storage ring, referred to as Extremely Brilliant Source (EBS) storage ring, is presently under construction, and the whole programme implementation started at the beginning of 2015. The new storage ring arcs have been developed and assembled during the last three years in parallel with the operation of the facility with the original ESRF storage ring, which came in user operation in September 1994. On 10 December 2018 ESRF user operation has been halted for a 20 months USM (User Service Mode) shutdown period. Since then, the original storage ring has been dismounted, the storage ring tunnel refurbished, and the new storage ring installed in the tunnel. The commissioning of the new EBS storage ring will start in December of this year, and the restart of the ESRF beamlines with the new X-ray source in March 2020. The USM is expected to resume on 25 August 2020.

The EBS programme is centred on the construction and commissioning of the new EBS storage ring, but it also includes the construction of four new flagship beamlines, the adaptation of recently constructed high-performance beamlines, and advances in instrumentation and data support programmes.

I will present the ESRF EBS programme and discuss some of the new scientific opportunities which are expected thanks to the new X-ray source performances. I will also present information on the present status of the programme and on the degree of its advancement.