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EUROPEAN SYNCHROTRON RADIATION FACILITY - THE EXTREMELY BRILLIANT SOURCE PROJECT

The ESRF-EBS (European Synchrotron Radiation Facility –Extreme Brilliant Source) is a major project that aims to create a new generation of synchrotrons with performances that are unique in the world. The ESRF-EBS is a major challenge requiring state-of-the-art accelerator technology to realise a very innovative relativistic electron beam dynamics design. The project sees the collaboration between France and Italy with INFN at the heart of the development of breakthrough technologies. This unique ESRF-EBS project is supported by the 21 partner nations of the ESRF, including France, the host-country, and Italy whose contributions to the ESRF amounts to 27.5% and 13.2% respectively. The principal aim of this project is to construct and commission the new 844 m circumference ESRF-EBS storage ring, over the period 2015-2022.

On the 8th of February, in Grenoble, the Director General of ESRF, Francesco Sette, the Chairman of the Council of the ESRF, Bertrand Girard, and the President of INFN, Fernando Ferroni, signed a collaboration agreement in the presence of the Italian and French Ministers, Stefania Giannini, Minister for Education, Universities and Research, and Thierry Mandon, Minister of State for Higher Education and Research. The agreement represents a key step in the construction and installation phases of the ESRF-EBS new storage ring that will be 100 times brighter than the existing source. It will result in an exchange of expertise and a strengthening of technical assistance between ESRF and INFN.

The collaboration between ESRF and INFN dates back to the very beginning of the ESRF, started in the 1980s. Nowadays, since 2011, collaboration between ESRF and INFN-LNF (INFN Frascati National Laboratory) has further strengthened with the conception and engineering design of the new revolutionary ESRF-EBS storage ring. INFN, with its pioneering work on DAFNE (the first accelerator made almost entirely with aluminium vacuum chambers) at the INFN-LNF, has helped in all aspects of the design and construction of the ESRF-EBS vacuum system. The high value

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brought in the project by the DAFNE experience and by the innovative study related to the electron-positron SuperB project - abandoned before construction due to budget constraint - is related to an innovative solution invented in Frascati and aimed at improving the performances of accelerators. To push the limits of accelerating machines, in fact, an alternative way than raising the current is to make the beam pipe smaller, in order to increase the amount of events in the collision point. The way to make beams as narrow as possible has been proposed in Frascati by the former INFN director of accelerators Pantaleo Raimondi who has been later appointed director of the ESRF's Accelerator and Source Division. Nowadays, the innovative solution represents an effective match between the two laboratories and as the DAFNE aluminium vacuum chamber is a good model for ESRF-EBS, the design of the beam pipes for ESRF-EBS has being established under the responsibility of INFN. ■