

## **FACTS about DanMAX**

**Equipment:** DanMAX will be one of a total of 14 beamlines at MAX IV, which is under construction. The beamline contains two measuring stations, one of which measuring station is to be used for 3D imaging and the other for diffraction measurements. The imaging can be used to study the inner structures of materials—both under static conditions and over time. The diffraction measuring station could, among other things, be used to examine the atomic structure of molecules and study the chemical processes by means of battery charging and discharging. The DanMAX instruments are being built at DTU and Aarhus University.

**DanMAX hours:** Denmark will have approx. 2,500 measuring hours/year at DanMAX, including time for industry and teaching. This corresponds to approximately half of the total available working hours at DanMAX.

**Access to MAX IV:** In addition to the time which is booked for Danish DanMAX users, Danish researchers will have access to the entire MAX IV through peer reviews, where their research projects are assessed in relation to all other applicants. Danish companies will typically have access to DanMAX through collaborations with one of the two Danish industrial portals: Imaging DTU and Diffraction AU. The companies can contact either of these portals if they have materials which they wish to have examined, as well as get help for more advanced studies at DanMAX.

**When:** DanMAX will be ready in 2019.

**Budget:** The total budget is almost EURO 13.3 million.

### **Contributors:**

The Danish Ministry of Higher Education and Science (EURO 4.7 million)

Technical University of Denmark, University of Copenhagen, and Aarhus University (EURO 3.3 million)

Capital Region of Denmark (EURO 1.6 million)

Central Denmark Region (EURO 0.8 million)

MAX IV (EURO 2.7 million)

## **FACTS about MAX IV and ESS**

**Where:** The MAX IV synchrotron will be built in Lund in Skåne, Sweden, and will become neighbour to the neutron radiation facility European Spallation Source (ESS), which Denmark and Sweden co-hosts. In other words, ESS and MAX IV will together form the world's best microscopes specifically dedicated to materials research, thus becoming a powerhouse for the entire Øresund region.

**When:** MAX IV will be inaugurated on 21 June 2016, while ESS is expected to be completed in 2020.

**Budget:** The construction of MAX IV costs EURO 0.53 billion kroner, and ESS costs EURO 1.9 billion. The Danish Ministry of Higher Education and Science pays 12.5 per cent of the costs for ESS. While the actual research facility will be built in Lund, the computing and software centre will be located in Copenhagen.

**About synchrotrons:** MAX IV is a synchrotron which consists of a storage ring with a circumference of 528 metres. In the storage ring, electrons circulate with very high energy (3 giga electron-volts), close to the speed of light. When the electrons are affected by magnets with changing magnetic fields, they are forced to move in a slalom pattern and thus emit X-ray radiation. Subsequently, the radiation is directed out into the 14 beamlines where it can be used for a wide range of different types of studies, including creating 3D images of the inside of materials.