**Host Institute**

The proposed project will be performed in the group of Georgios Katsaros at the Institute of Science and Technology Austria. The Institute of Science and Technology Austria (IST Austria) is a newly established, public research institution with an integrated PhD-granting graduate school. It is dedicated to basic research and is committed to becoming a world-class research center offering an international, state-of-the-art environment for scientists of the natural sciences, mathematics, and computer science. Founded in 2006 through an Austrian Federal Law, the IST campus in Klosterneuburg, 18 km from the center of Vienna, was opened for theoretical research in 2009 and for experimental research in 2010. As of today it hosts 40 research groups – which have been awarded with 27 ERC grants – and will grow by 5-7 new groups per year for at least the next five years. By actively promoting cross-disciplinary collaborations, IST Austria aims at breaking down the traditional boundaries between disciplines.

Research focus in the host group

In our group we study spin qubits in Ge based systems, self-assembled QDs and lithographically defined QDs in two dimensional hole gases. In parallel we aim to understand whether Majorana fermions can be realized and detected in a hole-type system.

Equipment and facilities at the host group

***The host group has several cryogenic setups which will be important for the realization of the project:***

He-4 System: System for fast sample testing and magnetotransport measurements at 4 K.    
He-3 System: Heliox-VL, sample in vacuum, base temperature 250 mK for 90 hours, variable temperature until 200K. Equipped with a 6T split coil magnet

Dry dilution refrigerators:

a) Dry dilution refrigerator with 75mm sample space, 48DC lines, 8 RF lines and a 9x3Tesla vector magnet with a top loading system for fast sample exchange. Base temperature 30mK

b) Dry dilution refrigerator with 42mm sample space, 48DC lines, 8 RF lines and a 9x3Tesla vector magnet with a bottom loading system for fast sample exchange. Base temperature 15mK.

c) Dry dilution refrigerator with 110 sample space, 96DC lines, 32 RF lines and a 9x3Tesla vector magnet with a top loading system for fast sample exchange. Base temperature: 20mK

From the above it become clear that are one the one hand enough setups for fast characterizations and on the other hand enough dilution fridges so that there will be at least 6 months per year dilution fridge measurement time. This is not possible in so many groups all around the world.

All the above mentioned setups are equipped with low noise home-made electronics acquired from the TU Delft/Quantum Transport Group.

In addition, apart from the cryogenic setups the host group has also all the necessary RF equipment, namely:

1. 600MHz lock-in amplifier
2. Vector network analyzer (20GHz)
3. Arbitrary waveform generator
4. Signal generator
5. Spectrum analyzer

Finally IST Austria has also a state of the art cleanroom where the samples to be measured in this project are going to be fabricated.