**Integration of ferroelectric materials on advanced gate-all-around device – an introduction**

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Since the discovery of Hafnium oxide (HfO2) as a ferroelectric material in 2011, considerable research efforts have been directed towards its exploration. A lot of dopants have been proposed in order to enhance its ferroelectric properties, with Zirconium oxide, hence called HZO, serving as the most prominent amongst others.

Although HfO2 has been known for its compatibility with CMOS as a high-k dielectric, it’s integration as a ferroelectric material as the gate dielectric poses challenges that have to be addressed towards ferroelectric devices applications, such as : proper crystalline phase identification techniques, activation anneal temperature and layer stability, electrical characterisation strategies concerning cycling and retention, as well as fabrication approaches. Furthermore, with the FET architecture roadmap moving to 3D concepts supplementary challenges concerning the integration come into play that require novel approaches in order to ensure a functioning integration into miniaturised vertical devices.

In this workshop, we present the state of the art concerning different concepts of HZO integration as ferroelectric material and ways to tackle this challenges towards a Vertical Nanowire Gate all around FeFET in the framework of the FVLLMONTI project.

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