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## **F. Conte - The tuning-on-demand paradigm of van der Waals heterostructures: from first-principles calculations to possible applications**

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In the recent years van der Waals heterostructures (vdWHs) have received great interest, due to their physical properties and attractive applications in nanoelectronics and optoelectronics. These systems have an unprecedented number of degrees of freedom, such as number of layers, stacking order, interlayer distance, twist angle and so on. Tuning them significantly affects the electronic properties of the system, leading to a new “tuning-on-demand paradigm”, which highlights how vdWHs can be suitably used for the implementation of new electronic devices and quantum technologies. In this talk this paradigm is applied to vdWHs based on transition-metal dichalcogenides (TMDs). First principles calculations of the structural and electronic properties of these systems unveil the richness and tunability of such properties, providing a contribution to new electronic devices architectures and quantum emitter configurations for nanophotonics and quantum information applications.

References - Felice Conte, Domenico Ninno, and Giovanni Cantele, Phys. Rev. B 99, 155429 (2019) - Felice Conte, Domenico Ninno, and Giovanni Cantele, “Bands tuning in transition metal dichalcogenide heterostructures: the interplay between thickness and electric field” submitted