



MACHINE LEARNING FOR ASTROPHYSICS

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High-performance computing (HPC)-based numerical simulations are indispensable in astrophysics and cosmology (A&C), aiding scientific understanding of celestial phenomena. These simulations model complex physical processes underlying observations, crucial for interpretation. Advancements in computational power promise transformative scientific discoveries through larger-scale simulations, especially critical in astrophysics, a field devoid of traditional lab experiments. Exascale computing systems pose a challenge as existing numerical codes aren't tailored for these complex architectures, limiting their potential. Recognising this gap, SPACE's primary aim is to adapt current A&C codes for pre-exascale HPC architectures funded by EuroHPC JU and future systems. This initiative, involving scientists, code developers, HPC experts, and hardware & software manufacturers, aims to redesign eight prominent European A&C HPC codes. The goal is to re-design these codes for efficient utilization of upcoming computing architectures. SPACE's efforts also focus on advancing workflows using machine learning and visualisation building an exascale ready numerical Laboratory for A&C.

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