ID de Contribution: **23** Type: **Présentation orale**

# Noise sustained versus self-sustained structures in rotor-stator flow

*lundi 17 juin 2024 12:20 (20 minutes)*

Rotor-stator flows are known to exhibit instabilities in the form of circular and spiral rolls. While the spirals are known to emanate from a supercritical Hopf bifurcation, the origin of the circular rolls is still unclear. A quantitative scenario for the circular rolls as a response of the system to external forcing is suggested. Two types of axisymmetric forcing are considered: bulk forcing (based on the resolvent analysis) and boundary forcing using direct numerical simulation. The linear gain curve shows strong amplification at non-zero frequencies following a pseudo-resonance mechanism. The optimal energy gain is found to grow rapidly with the Reynolds number (based on the rotation rate and interdisc spacing $H$) in connection with huge levels of non-normality. Presented results suggest that the circular rolls observed experimentally are the combined effect of the high forcing gain and the roll-like form of the leading response of the linearised operator. For sufficiently strong forcing amplitudes, the nonlinear response is consistent with the self-sustained states found recently for the unforced problem.

**Auteurs principaux:** GESLA, Artur (Sorbonne Université, LISN-CNRS); DUGUET, Yohann (LISN-CNRS); LE QUÉRÉ, Patrick (LISN-CNRS); MARTIN WITKOWSKI, Laurent (Université Lyon 1)

**Orateur:** GESLA, Artur (Sorbonne Université, LISN-CNRS)

**Classification de Session:** Présentations