

RF CONDITIONING OF MYRRHA COUPLERS AT IJCLAB

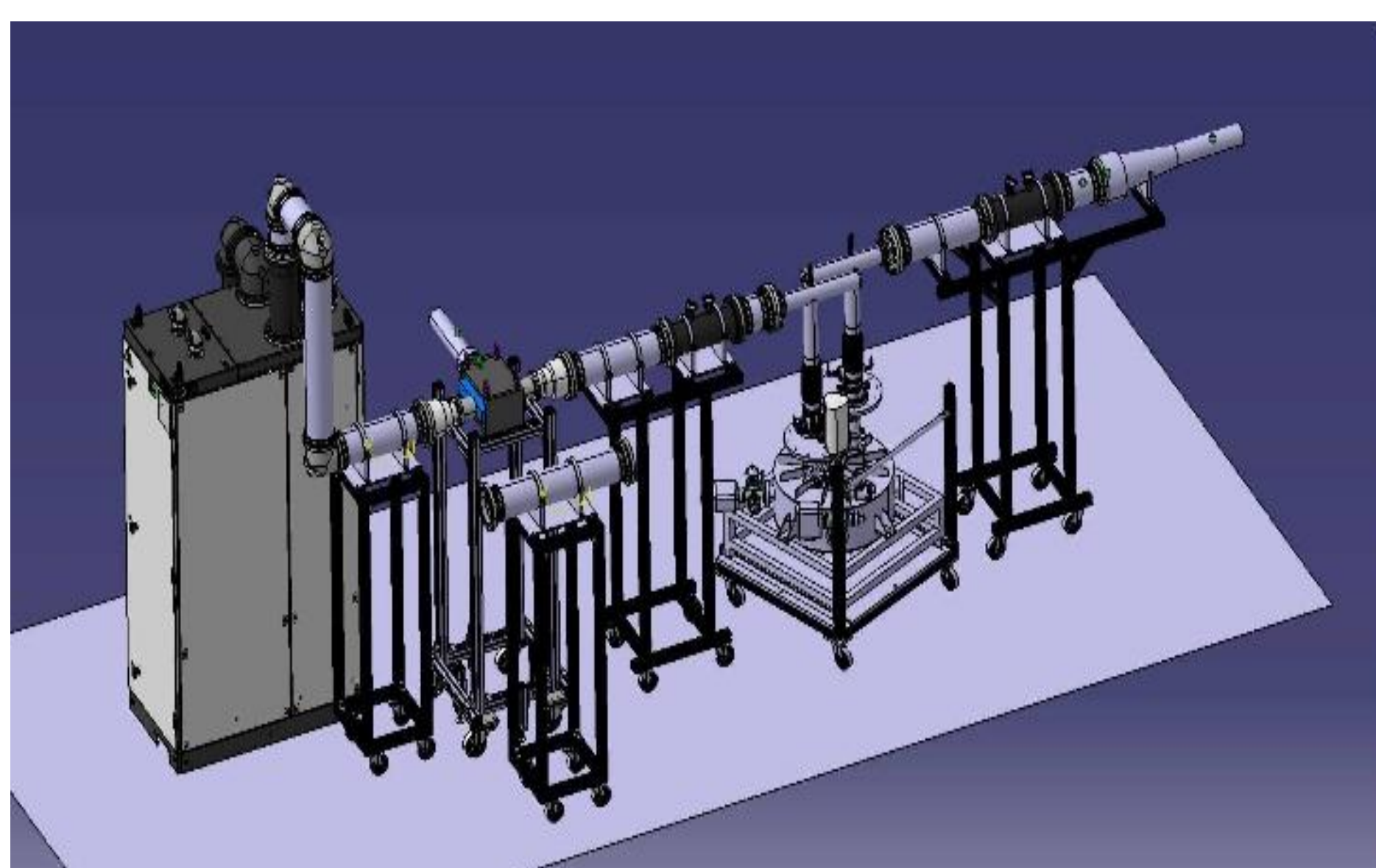
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Introduction

The MYRRHA project aims to build an Accelerator Driven System (ADS) at MOL (Belgium), driven by a superconducting LINAC (600 MeV, 4 mA proton beam), for irradiation and transmutation experiment purposes. The first section of the superconducting LINAC will consist of 352 MHz single spoke cavities housed in short cryomodules operating at 2K and powered by power couplers designed to support 80 kW CW at 352 MHz

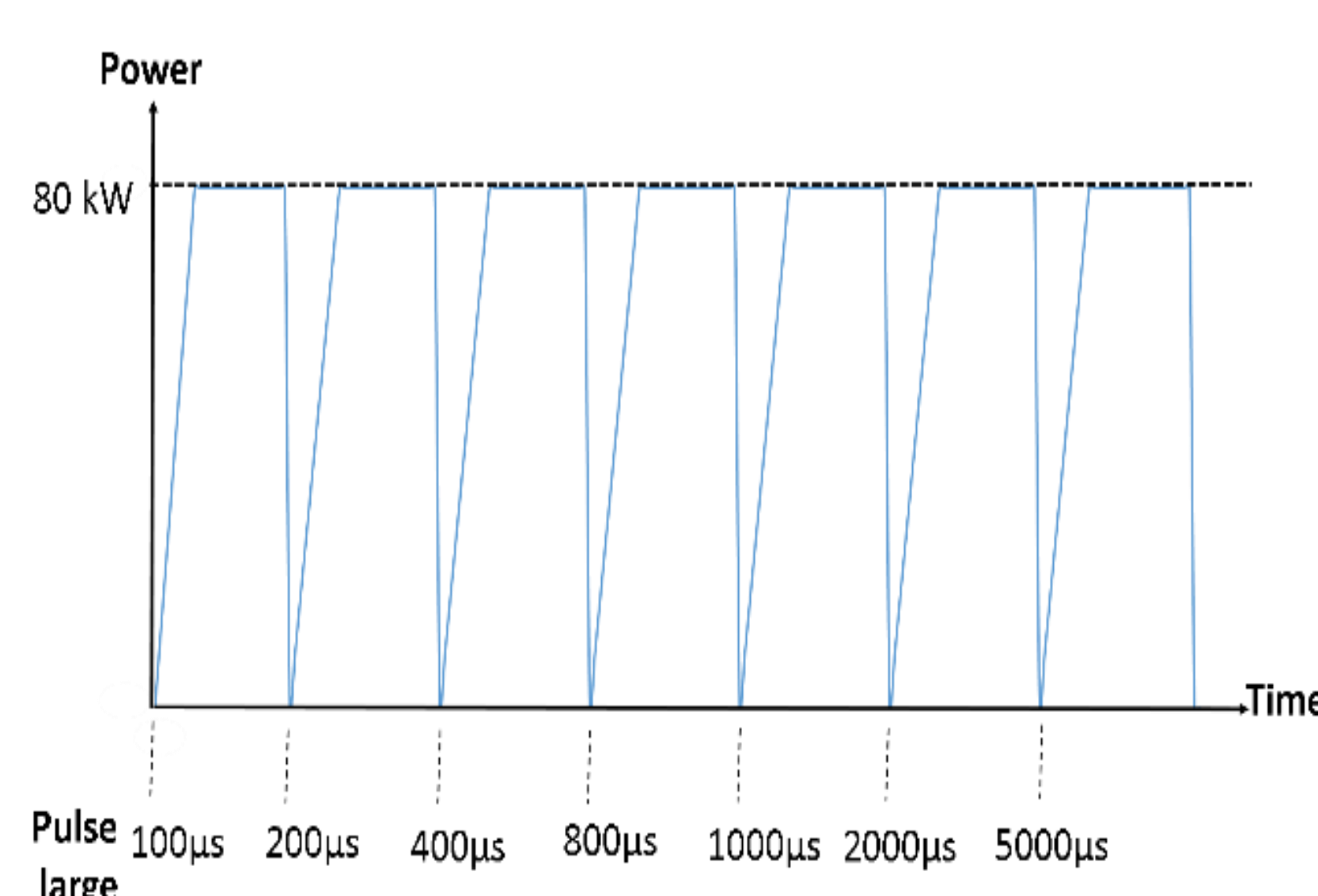
In the framework of the French contribution to MYRRHA project, the IJCLab has in charge the industrial monitoring, the quality control and the RF conditioning of the power couplers up to 80KW at 352 MHz, to equip spoke cavity cryomodules.

Couplers RF Conditioning process



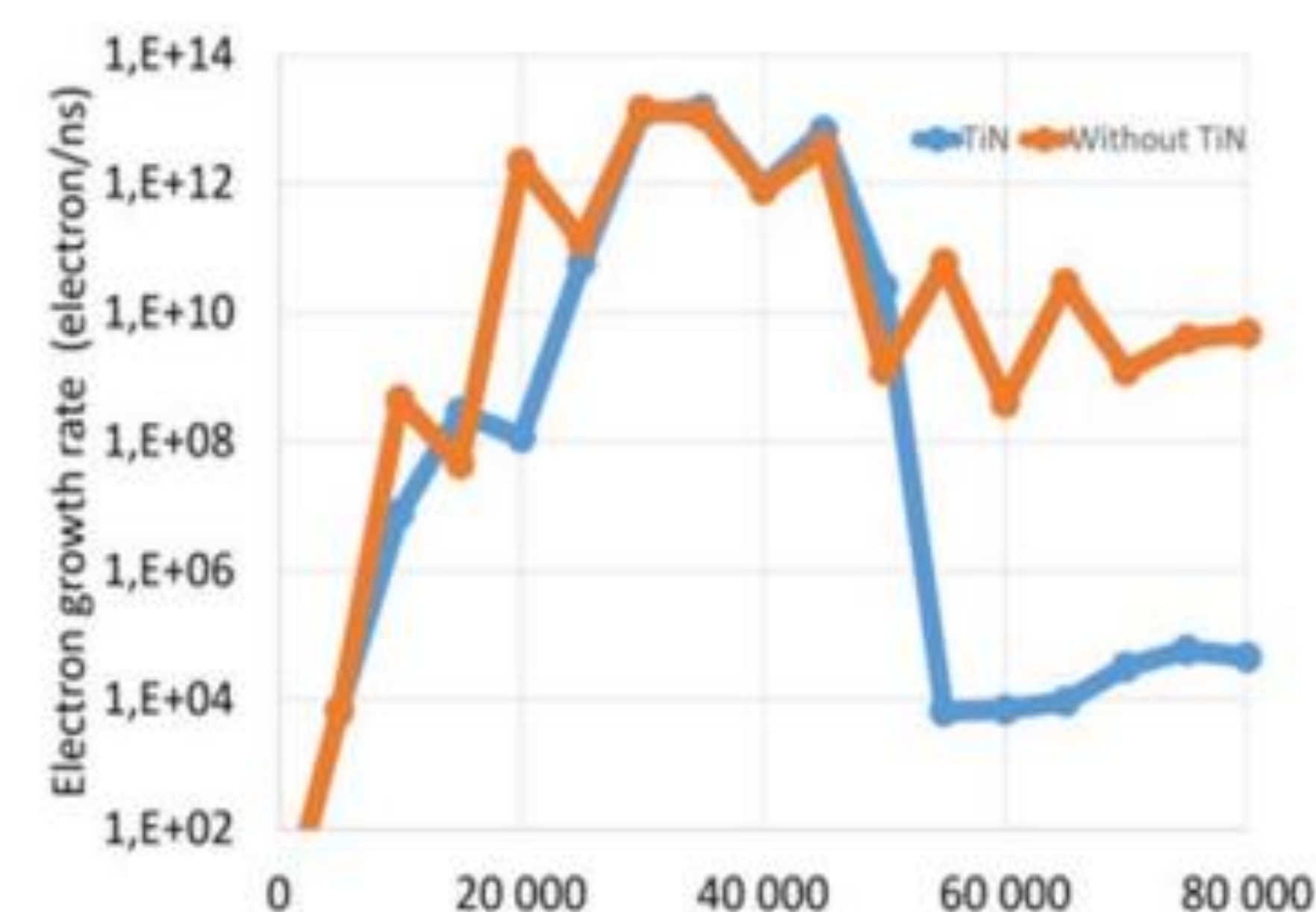
- The couplers conditioning process is fully automatized.
- Two types of conditioning performed: **Full transmission & Full reflexion**

RF conditioning procedure description



- Repetition frequency: 2Hz → 16Hz
- Pulse width: 100µs → 62ms
- Power: 0 → 80kW

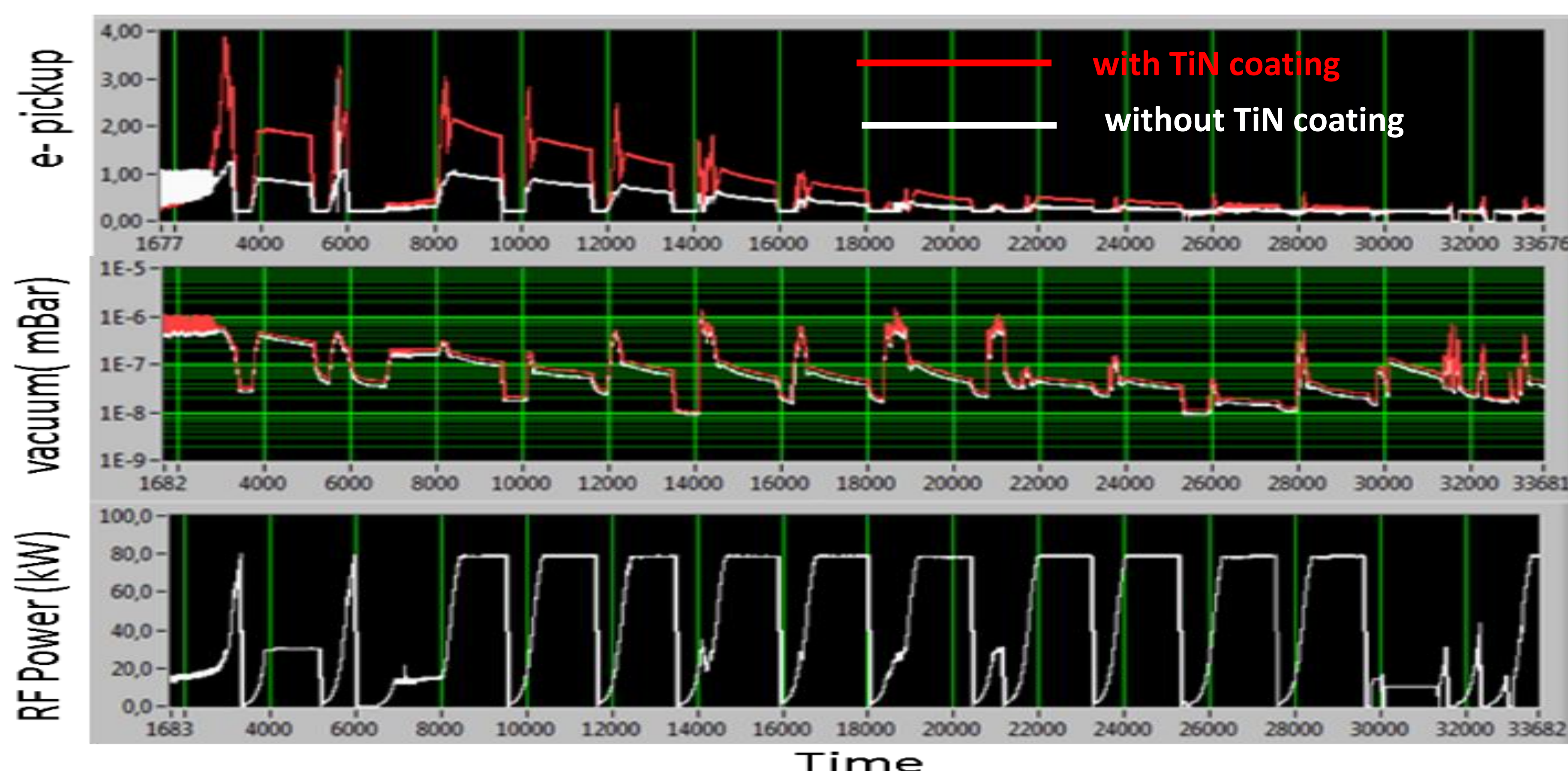
TiN coating & multipactor effect



- TiN coating has positive effect on the coupler conditioning efficiency
- Reduce the electron activity by a factor of 10⁵

Couplers RF Conditioning results

- Typical conditioning sequence
- Depending on power, different multipactor modes are excited and then damped
- Strong degassing at low powers, then stabilization as power increases
- TiN coating coupler reacts better to conditioning, with faster damping of the electron flow.



Conclusion

This first phase of the project has enabled us to gain the necessary experience in processing this type of coupler, and to gain a better understanding of RF behaviour. This first phase also enabled us to introduce improvements to the preparation and conditioning processes, with the aim of making the conditioning of the series shorter, regular and more efficient.