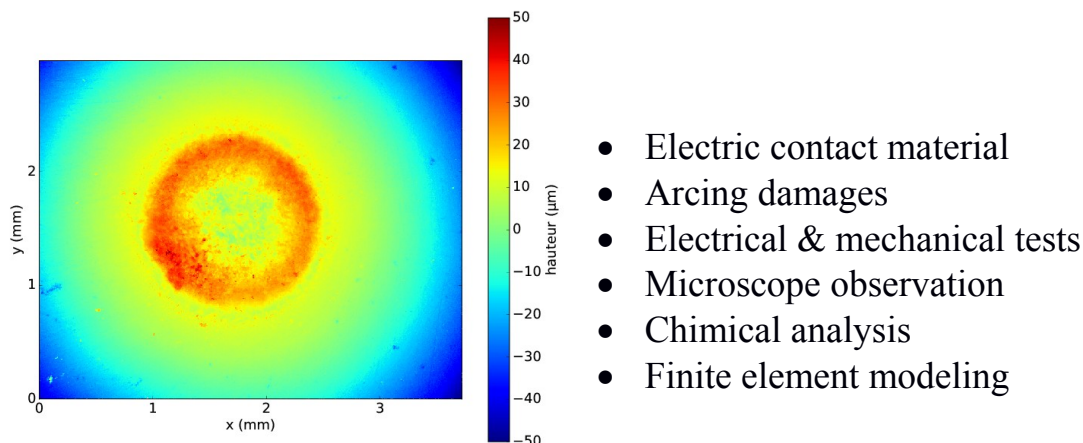


# Contribution to the study of the mechanical-electric-thermal interaction in the electrical contacts: application to a lifetime model of a contactor.

Aurélien FOUQUE  
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**Industrial Partner: Schneider Electric**

**Supervisors: G. Cailletaud / V. Esin (CdM) – R. Landfried / P. Testé / F. Houzé (GeePs) – A. Bonhomme / J.-L. Ponthenier / F. Chaudot (Schneider)**



**Fig.** view of the impact of an 300 A electric arc on the surface with a profilometer.

## **Abstract:**

The contactor is an electrical apparatus mostly found in an electric board. This switchgear is a switching device equipped with an electrical coil which enables to control electrical loads. For instance, a contactor can control three-phase electric motors, lighting, heating, and so on. A 24 V DC control circuit enables to make and break a current under 400/230V AC power circuit via an electrical coil.

Its repeated use over hundred of thousands cycles leads to the ruin of the electrical contacts. The failure of the contactor comes from the electric arc during every making and breaking. The electric arc damages the electrical contact material made of a pseudo-alloy silver, tin and copper oxides (Ag-SnO<sub>2</sub>-CuO).

The goal of this thesis is to modelize with the finite element code ZeBuLoN. Different experiments are carried to observe the evolution of the damage in the material and to estimate the current and power density injected from the arc onto the contact material.