

# **Electrical Engineering Laboratory of Oran**

## Scaling laws between mono and multi-point configurations in positive **DC corona discharge in air**

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## objectives

> Study of the evolution trend of the electrical parameters representing the electrical behavior of a positive DC point-plan corona discharge by increasing the number of tips. > Searching and establishment of possible scaling laws, which can exist when moving from a single-point to plan configuration to another with multi-points.

## Steps

Establishment of an equivalent circuit model of the positive DC point to plan corona discharge based on a deep theoretical and experimental (electrical and optical measurements) study of the discharge.

✓ identification of electrical parameters of the equivalent model using mathematical RLS (recursive least square) method.

✓ Comparison between the electric parameters of discharge obtained in the case of electrode configurations with one and two points, spaced apart and close together.

## INTRODUCTION

#### interest of positives point-plane corona discharges

- *Effective treatment of toxic gas discharge on stream or stationary at discharge* or post-discharge phase with a possibility of control through external parameters such as: Supply voltage (waveform), gas , inter-electrodes distance....
- 2. Best cost energy (low current of about some mA in the absence of a dielectric barrier)
- 3. Easy Integrability in industrial systems producing toxic gaseous pollutants

#### Objectives of this work:

Obtaining and comparing the electrical parameters of the equivalent model of the discharge in the case of a single point and two points, spaced apart and close together.

#### conduct a preliminary study to investigate and establish a possible scaling laws which can exist between the electrical parameters in the transition from a single to

## EXPERIMENTAL DEVICE



#### FIG.1. Simplified scheme of the experimental device.



RESULTS

## Identified electrical parameters and currents validation





Schema of different studied configurations



## Compared Identified electrical parameters







## PERSPECTIVES

**Study of the electrical behavior of the multi-point to plan corona discharges under a continuous supply for any number of tips.** 

**\***Search of scaling laws and study of electrical behavior of mono and multi-point-to-plane corona discharges under an impulse supply.

Acknowledgements

This work is done in partnership with the professor O. Eichwald (PRHE research team, LAPLACE Laboratory, Toulouse, France)