



HAL
open science

Numerical study of the Ranque-Hilsch vortex tube

Fian Assemien

► **To cite this version:**

Fian Assemien. Numerical study of the Ranque-Hilsch vortex tube. Complex Systems Academy. Complex Days, Mar 2019, Nice, France. , Complex Days, 2, Complex Days. hal-03865487

HAL Id: hal-03865487

<https://hal.science/hal-03865487>

Submitted on 29 Mar 2023

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

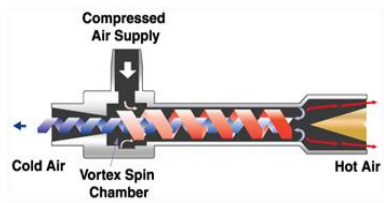
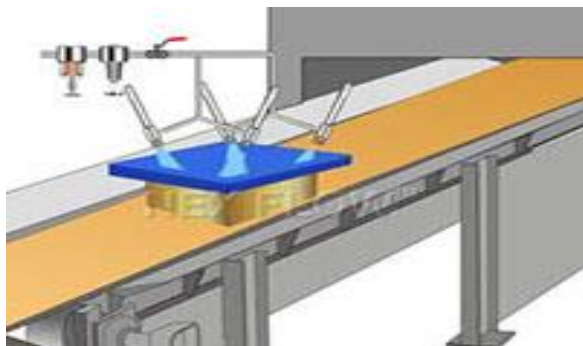


Distributed under a Creative Commons Attribution 4.0 International License

NUMERICAL STUDY OF THE RANQUE-HILSCH VORTEX TUBE

Fian ASSEMIEN

Presentation and applications

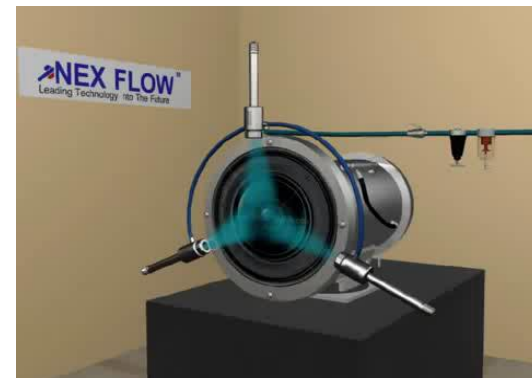
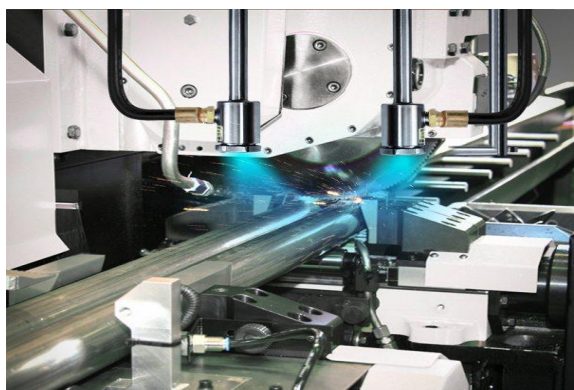


RHVT

Georges Joseph Ranque (1931)



Rudolph Hilsch (1946)

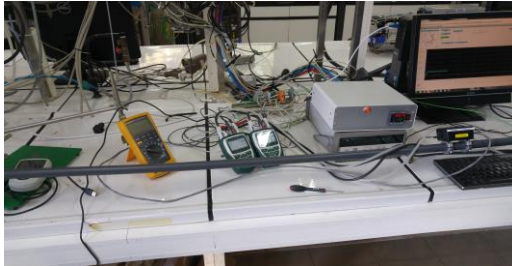


METHODS

Experimental study

Measurements

- Temperature
- Pressure



- Velocities
- Flow rates

Numerical study

$$\frac{\partial \rho}{\partial t} + \text{div}(\rho \mathbf{v}) = 0$$

$$\frac{\partial(\rho \mathbf{v})}{\partial t} + \text{div}(\rho \mathbf{v} \otimes \mathbf{v}) = -\nabla p + \text{div}(\bar{\boldsymbol{\tau}})$$

$$\frac{\partial(\rho h_t - p)}{\partial t} + \text{div}(\rho \mathbf{v} h_t) = \text{div}(\mathbf{v} \cdot \bar{\boldsymbol{\tau}} - \mathbf{q})$$

- Navier-Stokes equations
- Turbulence model

