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# Numerical study of the Ranque-Hilsch vortex tube

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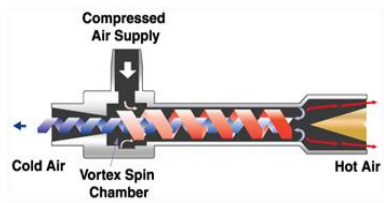
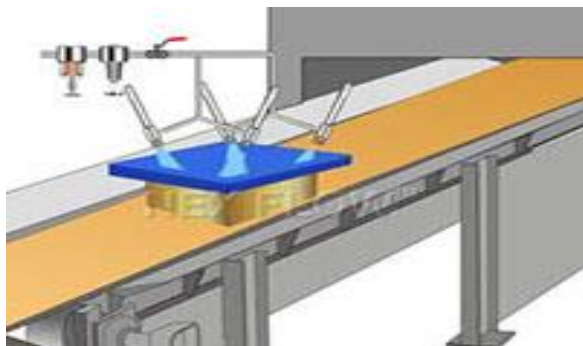


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NUMERICAL STUDY OF THE RANQUE-HILSCH VORTEX TUBE

**Fian ASSEMIEN**

## Presentation and applications

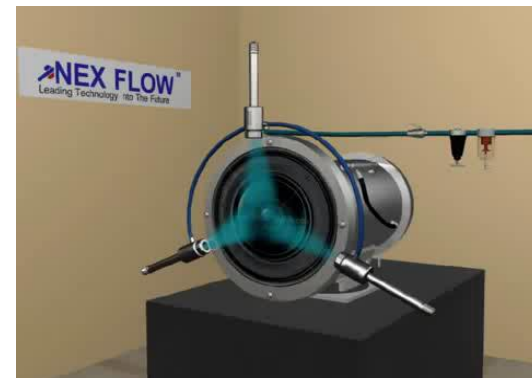
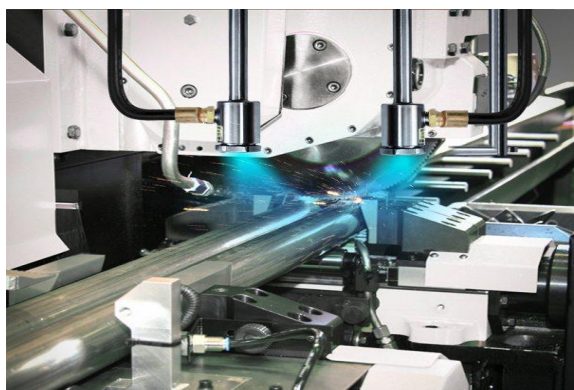


RHVT

Georges Joseph Ranque (1931)



Rudolph Hilsch (1946)

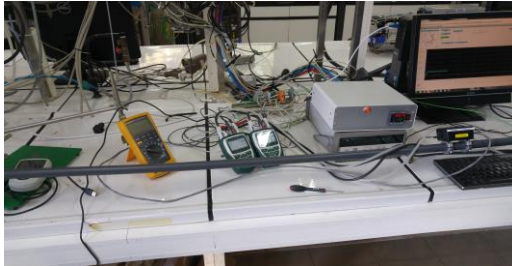


## METHODS

### 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

