

Engler-Bunte-Institut Teilinstitut Verbrennungstechnik (EBI-vbt)

Chemischer Gleichgewichtsrechner

Probieren Sie auf dieser Seite unser Programm für die Berechnung des thermodynamischen Gleichgewichtes einer Gasmischung
mehr ...

Tutoren/innen gesucht für Numerik-Praktikum

Wir suchen noch studentische Betreuer für das Praktikum Numerik im Ingenieurwesen.
mehr ...

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Link zur Seite:



Kooperationspartner:



Bachelor- und Masterarbeiten

Aktuelle Angebote für das Anfertigen von Bachelor- und Masterarbeiten finden sie auf der folgenden Seite.
mehr ...

"Untersuchung der Zündung under Sub atmosphärischen Bedingungen"

This work is part of the "SOPRANO" EU project. <http://www.soprano-h2020.eu/>

Reduce
gaseous
pollutants
and soot
particles

LOW EMISSION GOALS



Motivation

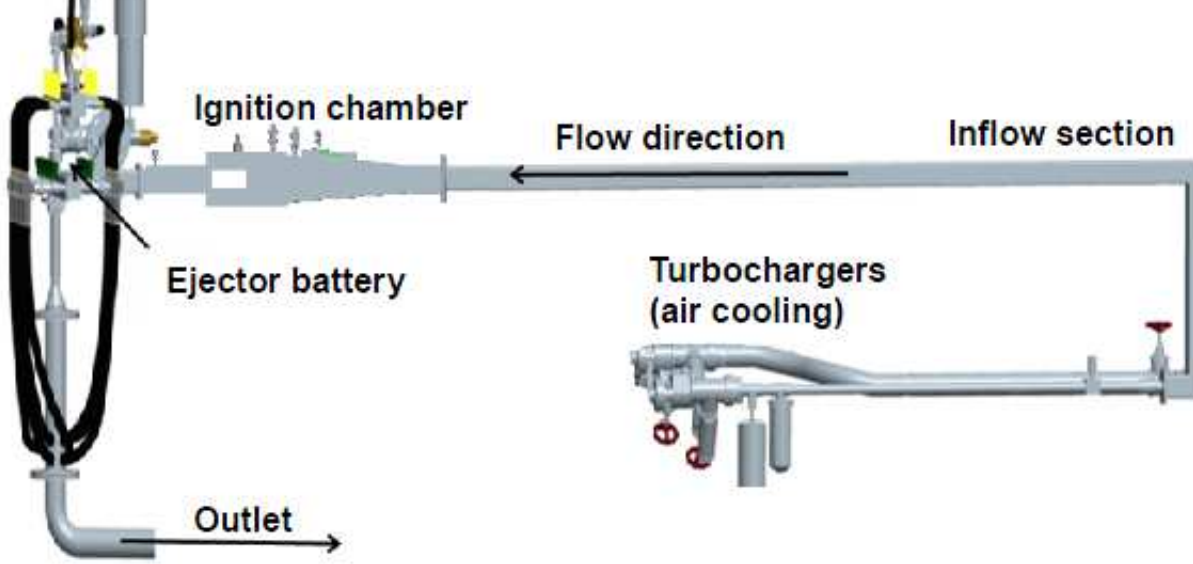
The ability to relight the jet engine after a flame out event is critical for flight safety. From an engineering perspective, ensuring the re-ignition and the subsequent proper spool up of the jet engine, beyond the inherent safety implications is a challenging process. One reason that makes the relight process of the engine difficult is the low temperature and low pressure, which slows the evaporation of the atomized fuel and limits the concentration of the oxygen and therefore the reaction rates.

The development of modern combustors for jet engines has been challenging for engineers, due to the conflict of interest among emission standards, flame stability and engine's relight. The better understanding of the re-ignition process has a fundamental importance since it aids the development in the early stages and therefore reduces significantly the design iterations. Furthermore, future concepts with lean burning, which counter the (NO_x) emissions could be realized.

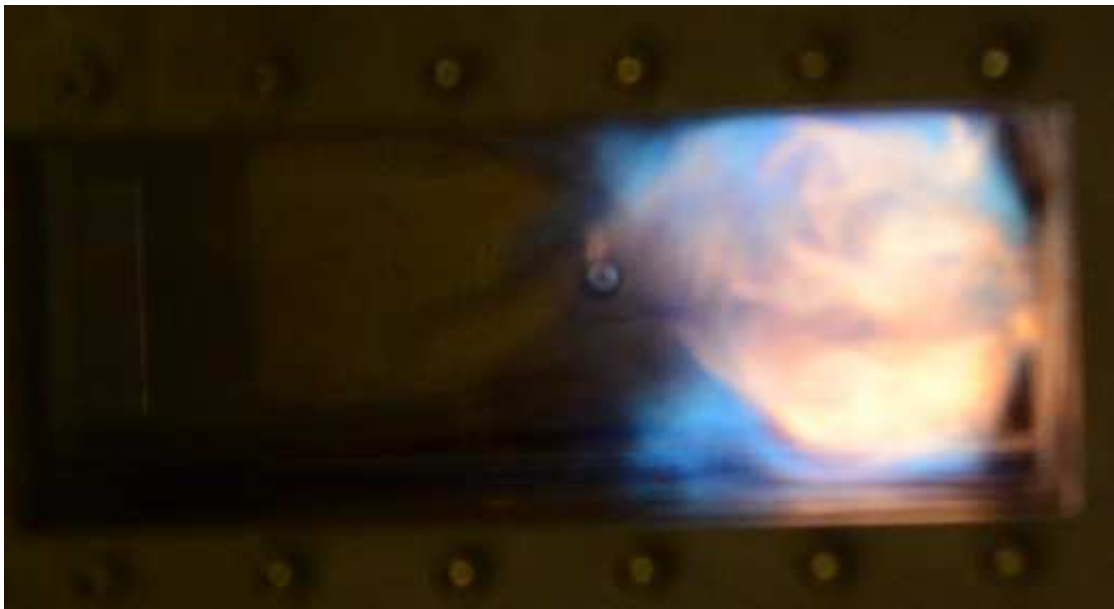
ISCAR rig and Combustion chamber

The experiments are conducted at the ISCAR ("Ignition under Sub atmospheric Conditions-Altitude Relight) rig. It is one of the few experimental facilities worldwide, which simulates the high altitude conditions (low pressure and temperature) for flowing kerosene-air mixtures.

In this research activity a single injection RQL (Rich-Quench-Lean) combustion chamber is used. It has been developed by Engler-Bunte-Institute within the scope of SOPRANO EU Project. The configuration is quite realistic and consists of dilution and effusion cooling holes, which have been sized to reproduce the conditions of a real engine. The chamber provides optical access via quartz windows, which facilitates high speed imaging recording of the unsteady flame kernel generation and propagation.

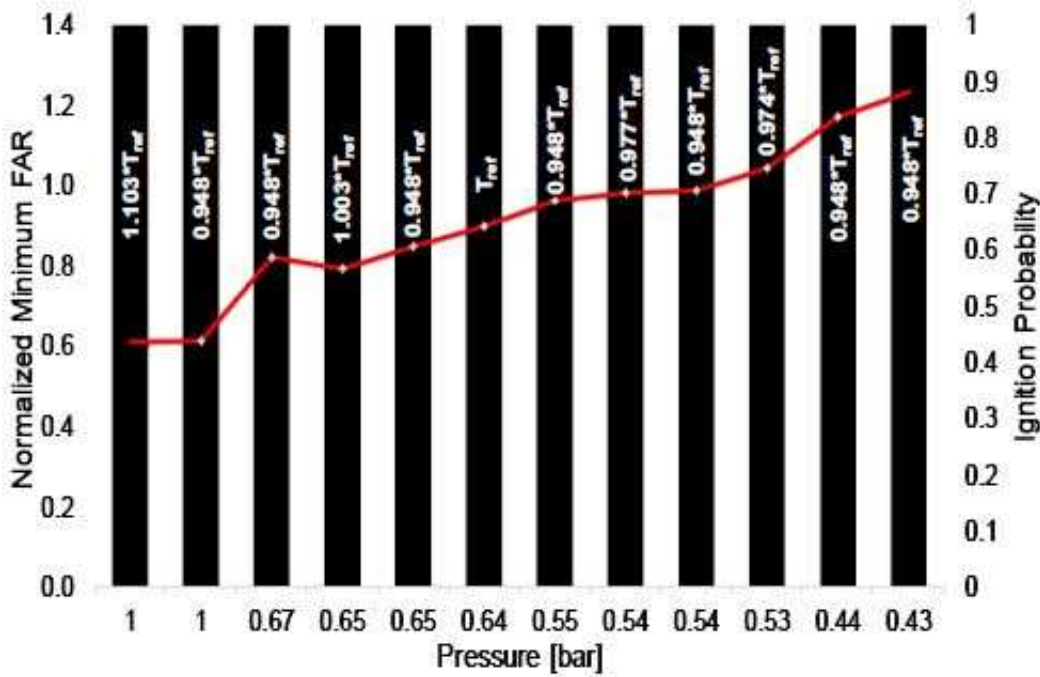
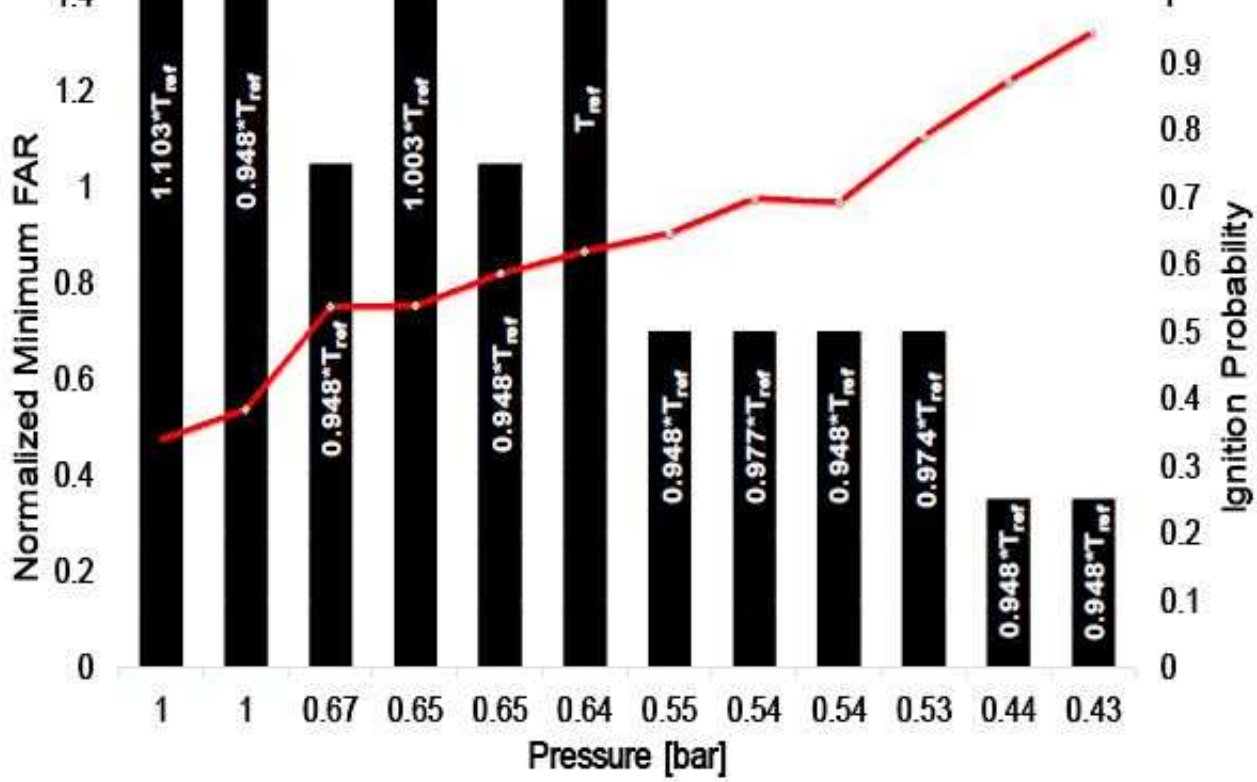


Simplified overview of the ISCAR rig



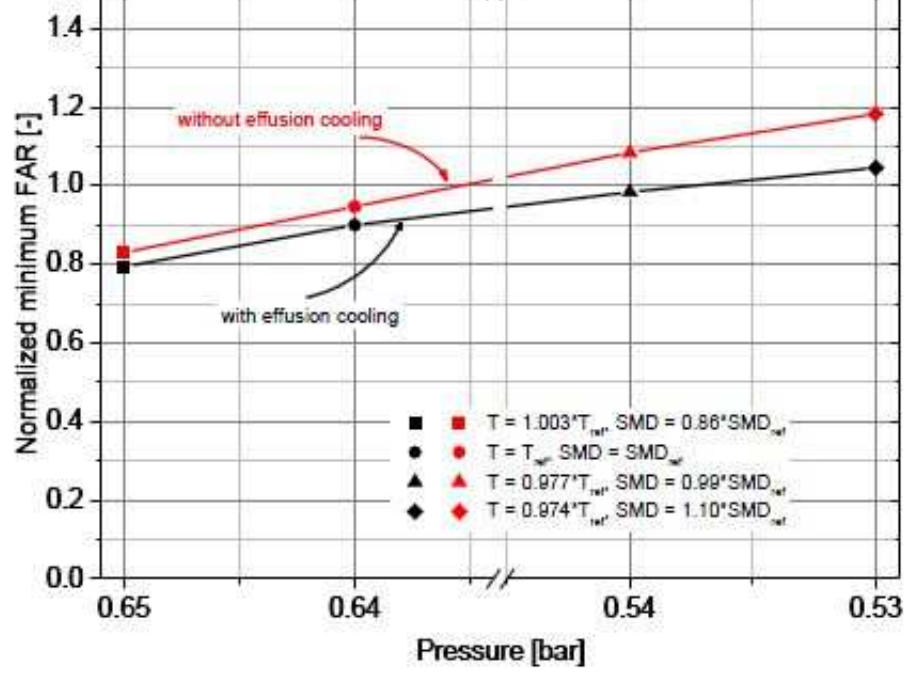
Combustion chamber in operation

Experimental results

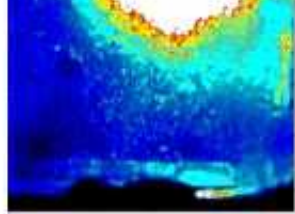


Ignition probability without effusion cooling

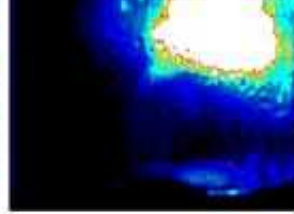
Ignition probability with effusion cooling



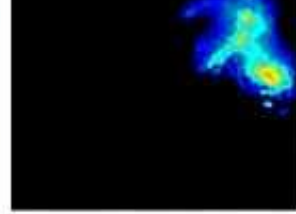
Minimum FAR comparison of the two configurations



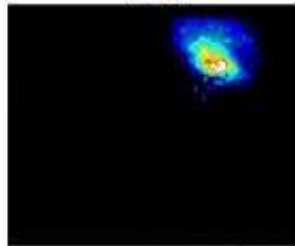
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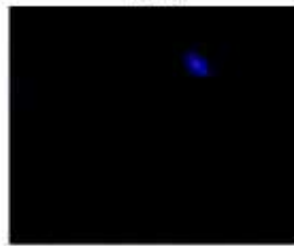
2 ms



5 ms



10 ms



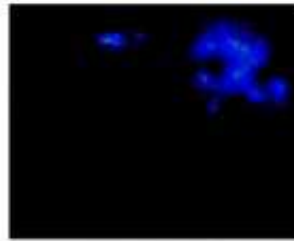
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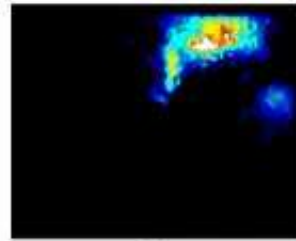
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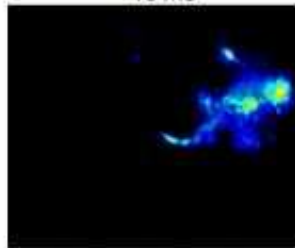
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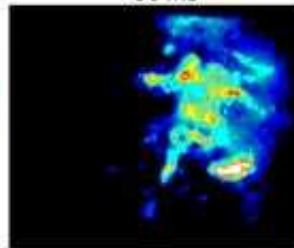
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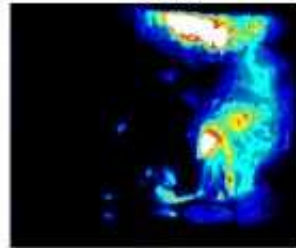
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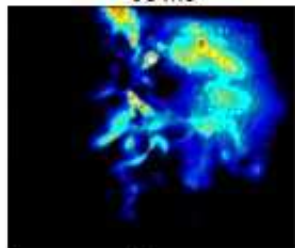
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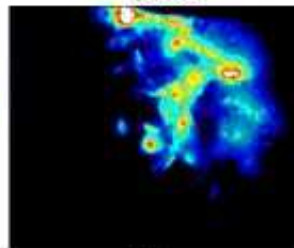
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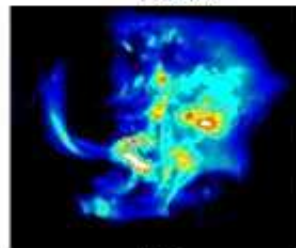
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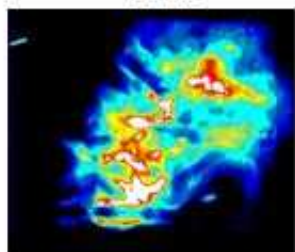
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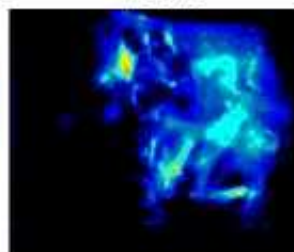
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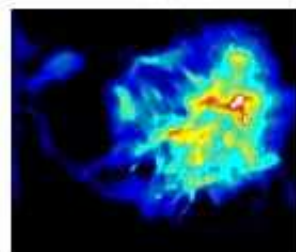
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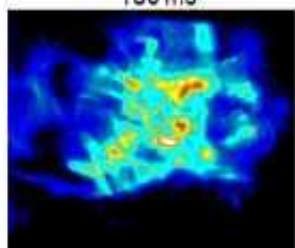
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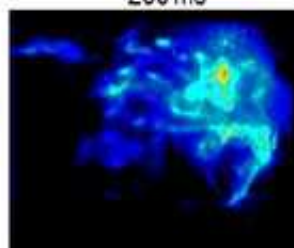
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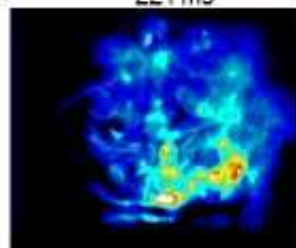
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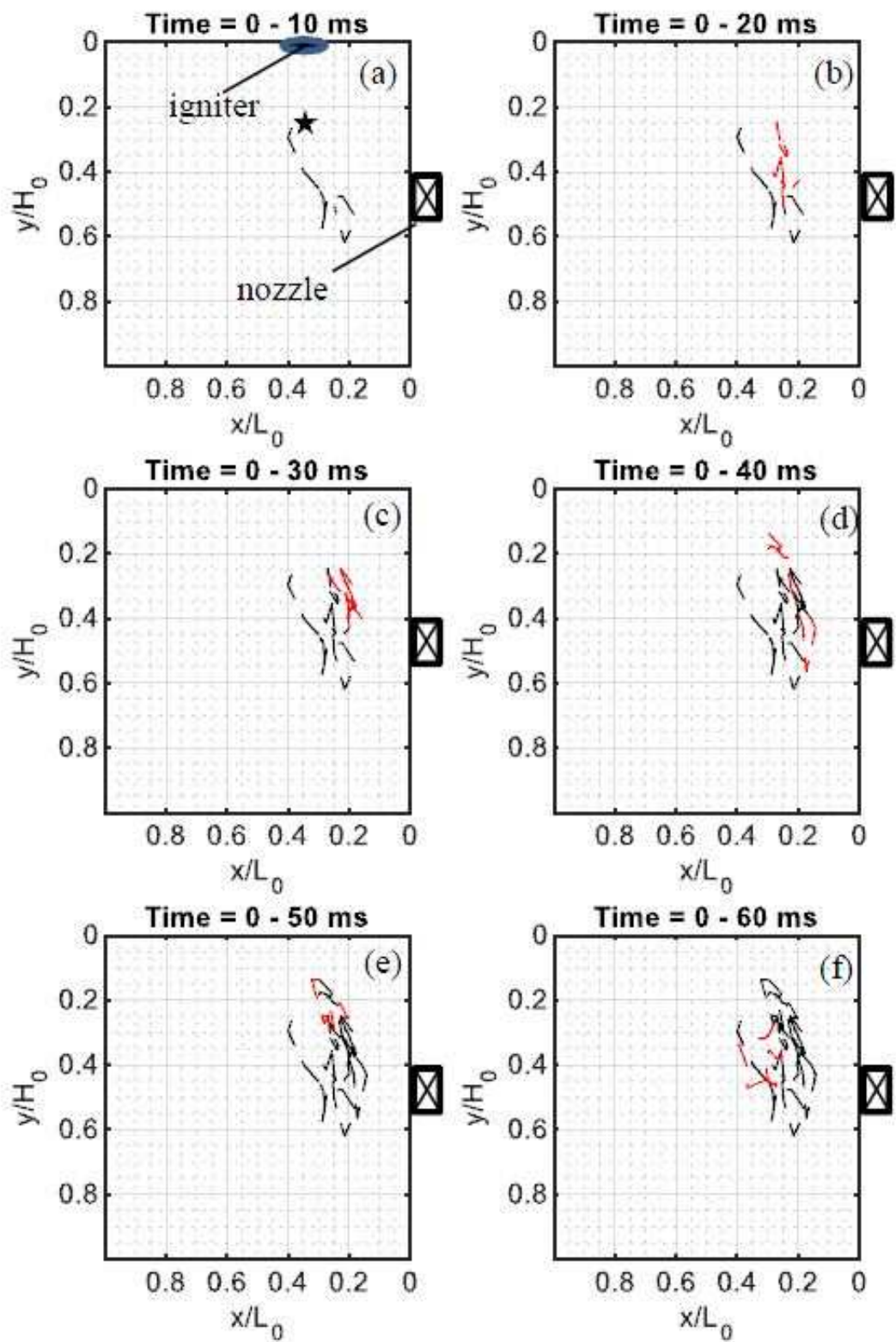
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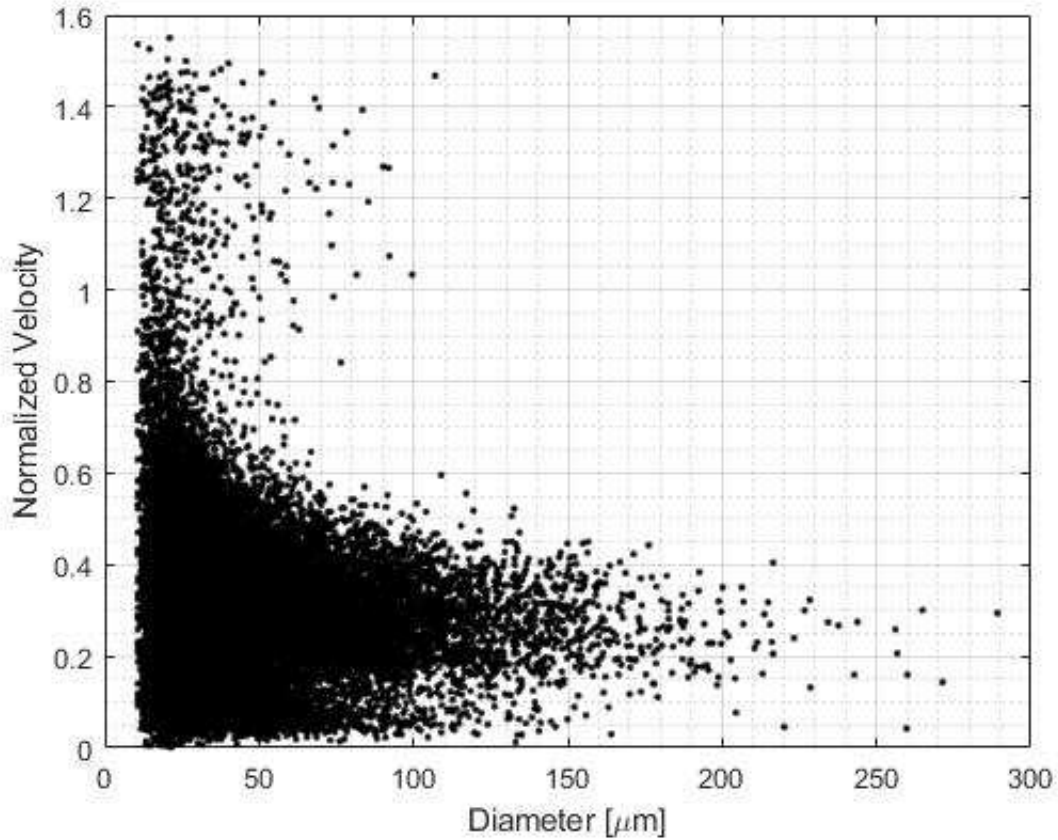
370 ms



450 ms



Tracking of flame's luminosity center



Spray measurements under high altitude conditions

[IMAGE]
Update Page

Nach oben
KIT - Die Forschungsuniversität in der Helmholtz-Gemeinschaft

- Heruntergeladen am Tue Sep 29 09:01:00 CEST 2020 ; eine aktuelle Version finden Sie unter: