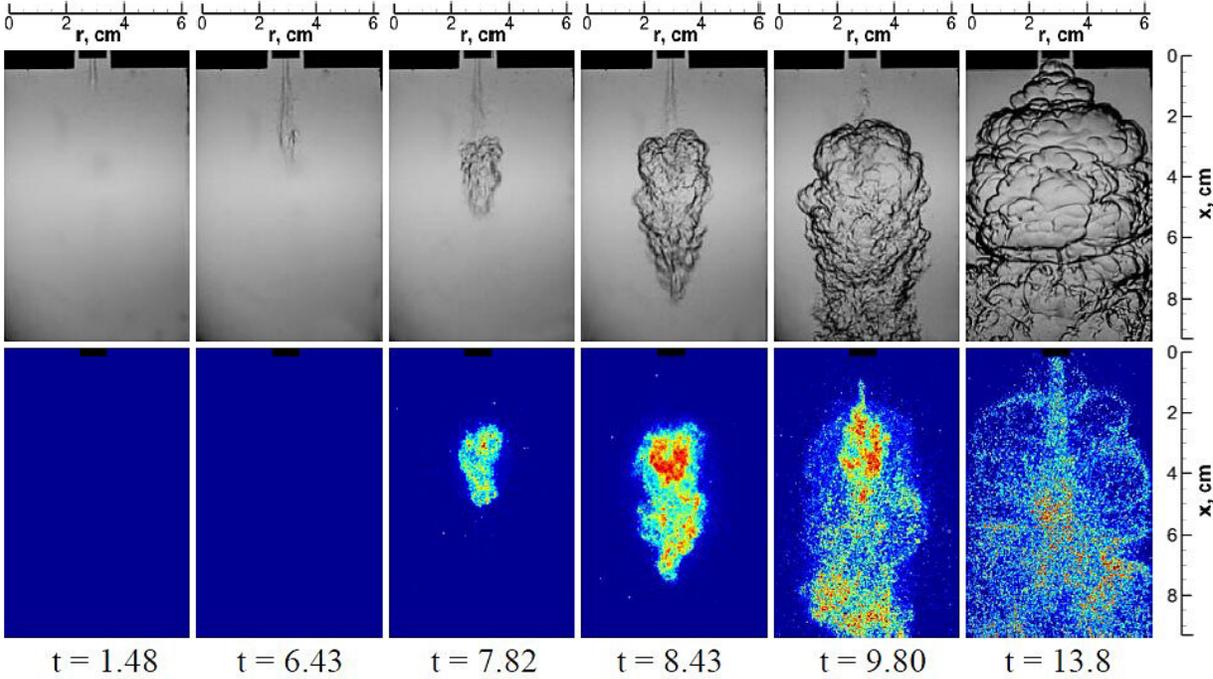


Jet ignition technology could boost efficiency and lower emissions of combustion engines

August 7 2019, by Chris Adam



Here are sequences of images showing the jet (produced from pre-chamber on the top) penetrating into the main chamber and igniting the main-chamber mixture. Credit: Purdue University

The same technology used in jets soon may be powering personal cars and other automobiles.

Purdue University researchers are now working to develop pre-chamber

[technology](#) for automobiles to replace conventional spark plugs.

A tiny chamber, called a pre-chamber, is filled with a mixture of fuel and air. The mixture ignites, producing combustion, and tiny holes in the bottom of the chamber release the hot combustion products in the form of powerful jets, which penetrate into the main chamber and cause ignition.

Compared with traditional spark ignition, this method provides a large surface for multiple-site ignition and fast flame propagation and enhances the overall combustion efficiency. Both passive and active pre-chambers are being considered. For the former, the main-chamber mixture is pushed into the pre-chamber by compression stroke through the [tiny holes](#); and for the latter, additional fueling is supplied to the pre-chamber to facilitate leaner operation of the main combustion chamber.

"We have great potential at Purdue for research into automotive technology and the engines of the future," said Li Qiao, an associate professor of aeronautics and astronautics in Purdue's College of Engineering. "This pre-chamber jet ignition technology is an example of how researchers across engineering and science come together at Purdue to create novel solutions."

Qiao said the technology her team is working with already has been used in large bore [natural gas engines](#) and in some F1 racing cars because of its superior performance, but it is new to gasoline engines.

"The [auto industry](#) is feeling the pressure to optimize these engines because of the competition from [electric vehicles](#)," Qiao said. "Several automotive [engine](#) companies have started exploring pre-chamber technology for passenger cars."

Qiao is currently collaborating with industry on design and optimization

of passive and active pre-chambers for gasoline engines.

Provided by Purdue University

Citation: Jet ignition technology could boost efficiency and lower emissions of combustion engines (2019, August 7) retrieved 10 December 2023 from

<https://techxplore.com/news/2019-08-jet-ignition-technology-boost-efficiency.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.