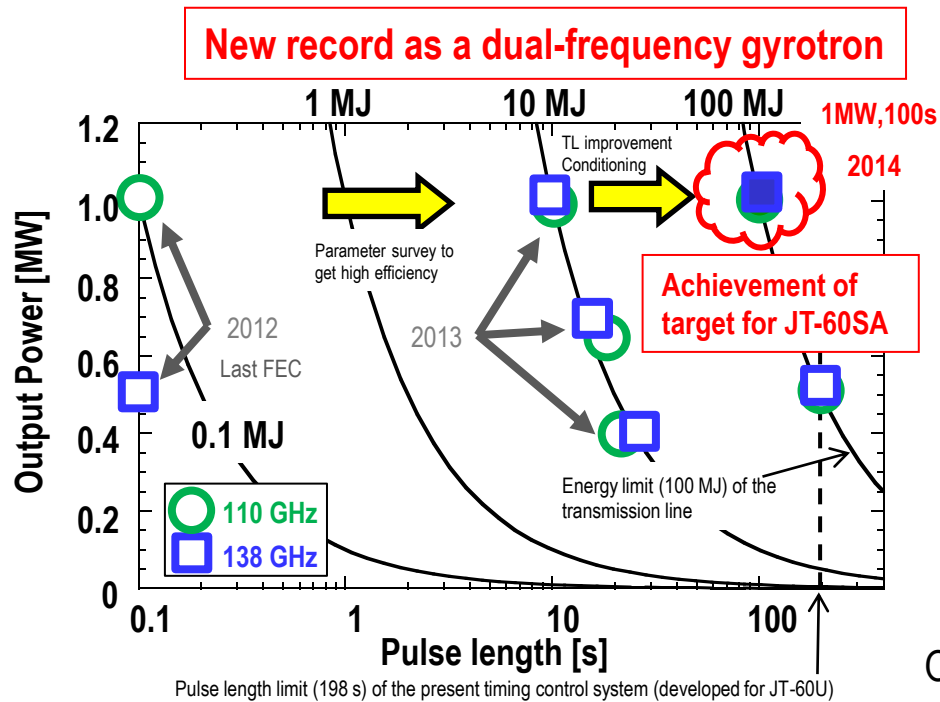


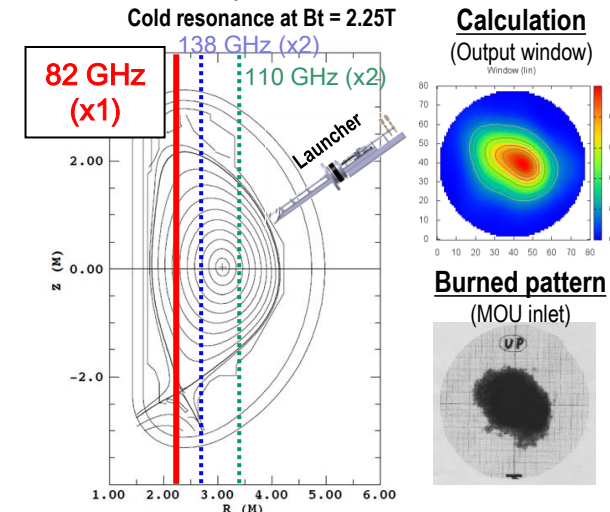
# Development of Dual-frequency Gyrotron and Launcher for the JT-60SA ECH/ECCD System

Success of the **dual-frequency gyrotron** development  
(**110/138 GHz, 1MW, 100s**) for JT-60SA



- ✓ **New record** of a dual-frequency gyrotron.
- ✓ The target for JT-60SA has been fully satisfied.
- ✓ High oscillation efficiency > 30% (without effect of energy recovery by collector potential depression).
- ✓ Low heat load was confirmed. It will enable 1.5 - 2 MW (for several seconds) oscillations.
- ✓ Launcher/polarizer were developed for dual-frequency operations of the ECH/ECCD system.

Additional frequency of **82 GHz** is also successful



- ✓ An oscillation at **82 GHz** (0.3 MW, 20ms) was demonstrated by the same gyrotron
- ✓ A possibility of the use of **fundamental harmonic waves** (<1MW, <1s) in JT-60SA.

Optimized **electron pitch factor** available with a **triode electron gun** through the anode-cathode voltage ( $V_{ak}$ ) control resulted in **high-efficiency at both frequencies**.

