

# Cavity Simulator in FPGA

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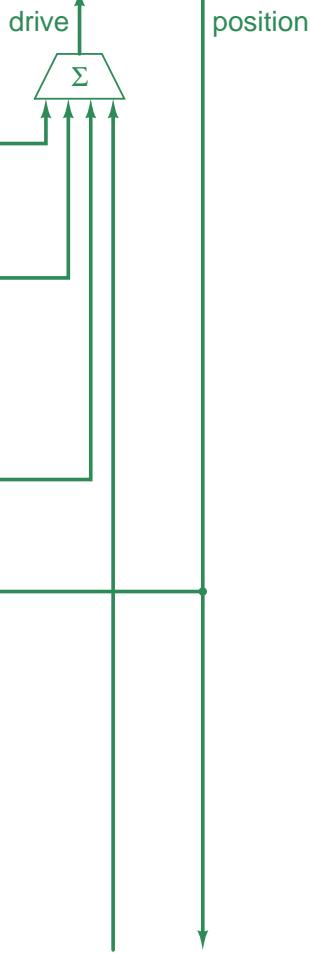
(abridged)

Clocks at ~200 MHz in Xilinx 7Axxx  
8 cavity-controller pairs could fit on AC701?

m mechanical modes updated every 2m cycles

Mechanical eigenmode propagator  
 $zy = My + d$

resonator.v



Gaussian noise  
Environmental sources?

outer  
outer\_prod.v

Piezo control

Virtual Piezo

outer  
outer\_prod.v

Beam timing

Cavity electromagnetics simulator

Electromagnetic eigenmode propagator  
( $\pi$  mode)  
cav\_mode.v

outer  
outer\_prod.v

Electromagnetic eigenmode propagator  
( $8\pi/9$  mode)  
cav\_mode.v

outer  
outer\_prod.v

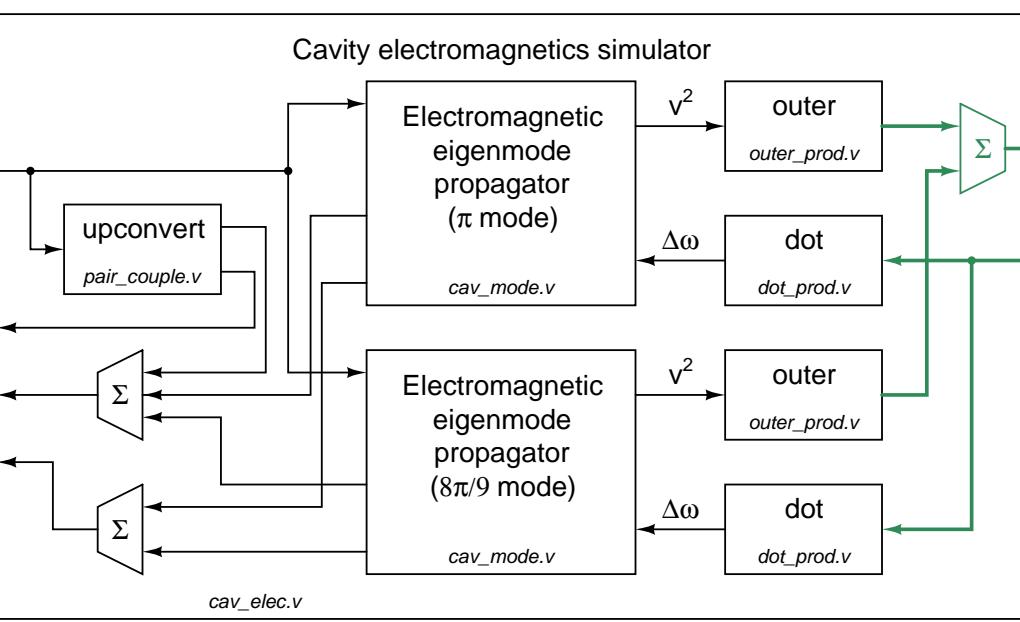
Drive

Forward

Reflected

Probe

Outputs at IF  
updated every 10 ns



cav\_elec.v

to additional cavities