Leak-optimized fast-LQG-IC HPF; gain\_slow=2.0, fast LQG noise=0.004, f\_cutoff=34.0  $leak\_slow=0.9$ ,  $leak\_fast=0.999999$ , r0 NCP = 0.6m10<sup>3</sup> 1.0 This controller -atm\_error\_at\_f\_X -ncp\_error\_at\_f\_X (1.4, 0.4) integrator 0.9 (rad) ncp\_error\_at\_f\_Y -Reference ro 10<sup>1</sup> 0.5 noise\_error\_at\_f\_X cost cutoff freq. 0.8 error  $10^{-1}$ 0.0 -0.5 $10^{-3}$ losed -1.00.5 -1.0 -0.50.6 0.8 1.0 1.4.6 2.0 6.0 4.0 NCP ro (m) Frequency (Hz) X = 0.719 radY = 1.112 rad10<sup>2</sup> 10<sup>2</sup> Open-loop atm 10<sup>0</sup> 10<sup>0</sup> Open-loop NCP  $(rad^2/Hz)$ 10<sup>3</sup> Open-loop noise 10<sup>-2</sup> 10<sup>-2</sup> Closed loop at X Closed loop at Y 10<sup>0</sup>  $10^{-4}$ |phi\_to\_X|2 |Lfast\_to\_X|2 |phi\_to\_Y|² |Lfast\_to\_Y|² Power  $10^{-6}$  $10^{-6}$ 10<sup>-3</sup> |Lslow\_to\_X|2 |Nfast\_to\_X|2 Lslow\_to\_Y|2 10<sup>-8</sup> 10<sup>-8</sup> |Nfast\_to\_Y|2 |Nslow\_to\_X|2 |Nslow\_to\_Y|2  $10^{-10}$  $10^{-3} \quad 10^{-2} \quad 10^{-1} \quad 10^{0} \quad 10^{1} \quad 10^{2}$  $10^{-3} 10^{-2} 10^{-1} 10^{0} 10^{1} 10^{2}$  $10^{-3} 10^{-2} 10^{-1} 10^{0} 10^{1} 10^{2}$ Frequency (Hz) Frequency (Hz) Frequency (Hz) 0.7250 0.71910 0.726 0.7225 0.71905 0.724 0.7200 0.71900 0.722 0.7175 0.7150 0.71895 0.720 -2.0-2.525 40 1.90 1.95 2.00 2.05 2.10 30 35 -3.0gain\_slow log\_lqg\_noise f\_cutoff  $7.189320 \times 10^{-1}$ 0.90  $7.189300 \times 10^{-1}$ 0.85 error  $7.189280 \times 10^{-1}$ 0.80  $7.189260 \times 10^{-1}$  $7.189240 \times 10^{-1}$ 0.75  $9.9999009 \times 9999 \times 9259 \times 9999 \times 99$ 0.50 0.00 0.25 0.75 1.00 leak\_fast leak slow