Same validation volumes · where each loss helps or hurts (blue = lower error)

	Density fluct.	Electron temperature fluct.	Ion temperature fluct.	Potential fluct.	Parallel velocity fluct.	Particle local	Electron energy local	Ion energy local	Total energy local	Particle integrated	Electron energy integrated	Ion energy integrated	Total energy integrated	Electron target heat	Ion target heat	Total target heat
Pretrained → balanced	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%	+0.0%
Pretrained → covariance	+3.0%	+3.1%	+2.5%	+3.1%	+2.1%	+2.3%	+2.4%	+2.4%	+2.4%	+8.8%	+8.2%	+7.9%	+8.2%	-3.5%	+0.7%	-2.9%
Pretrained → joint distribution	+0.4%	+0.3%	+0.2%	+0.3%	+0.2%	+0.2%	+0.2%	+0.2%	+0.2%	+0.4%	+0.9%	+0.6%	+0.7%	-3.9%	-2.3%	-3.6%
Scratch → balanced	+2.4%	+0.8%	+1.2%	+3.1%	+0.5%	+3.7%	+4.4%	+4.1%	+4.2%	+7.3%	+5.7%	+5.2%	+4.7%	+33.4%	+5.9%	+29.5%
Scratch → covariance	+5.6%	+4.1%	+4.0%	+6.3%	+3.3%	+6.7%	+7.1%	+7.0%	+7.0%	+7.8%	+8.5%	+9.0%	+8.2%	+17.8%	+11.9%	+16.4%
Scratch → joint distribution	+2.0%	+0.5%	+0.9%	+2.9%	+0.2%	+3.6%	+4.3%	+4.0%	+4.1%	+10.5%	+8.7%	+11.0%	+9.5%	+26.3%	+8.5%	+23.9%

% error change versus pretrained balanced

15
10
5
0
−5
−10
−15