

**MoG model with  $d = 20$ ,  $q = 5$ , and  $n = m = 2 \cdot 10^4$**

$\mu$ -deformation							$\Sigma_{ii}$ -deformation						
Statistic	$\epsilon_{95\%CL}$	$\epsilon_{99\%CL}$	$t$ (s)	$\epsilon_{95\%CL}$	$\epsilon_{99\%CL}$	$t$ (s)	Statistic	$\epsilon_{95\%CL}$	$\epsilon_{99\%CL}$	$t$ (s)	$\epsilon_{95\%CL}$	$\epsilon_{99\%CL}$	$t$ (s)
$t_{SW}$	$0.0705^{+0.029}_{-0.03}$	$0.09728^{+0.028}_{-0.027}$	<b>2879</b>	$0.02552^{+0.0073}_{-0.0093}$	$0.03528^{+0.0065}_{-0.0072}$	<b>3063</b>	$t_{SW}$	$0.00723^{+0.0002}_{-0.0027}$	$0.01001^{+0.0017}_{-0.0021}$	3020	$0.00268^{+0.00078}_{-0.001}$	$0.00381^{+0.00066}_{-0.0008}$	3153
$t_{KS}$	$0.05224^{+0.019}_{-0.021}$	$0.0723^{+0.017}_{-0.018}$	2976	$0.02037^{+0.0044}_{-0.0062}$	$0.02765^{+0.0037}_{-0.0043}$	3092	$t_{KS}$	$0.0086^{+0.002}_{-0.0024}$	$0.01178^{+0.0016}_{-0.0018}$	4984	$0.01094^{+0.0026}_{-0.0032}$	$0.01482^{+0.0021}_{-0.0023}$	3782
$t_{SKS}$	$0.08351^{+0.042}_{-0.035}$	$0.11456^{+0.039}_{-0.032}$	3069	$0.02984^{+0.0081}_{-0.0089}$	$0.04052^{+0.0071}_{-0.0069}$	3280	$t_{SKS}$	$0.0069^{+0.0014}_{-0.0019}$	$0.00915^{+0.0011}_{-0.0014}$	3261	$0.19595^{+0.03}_{-0.043}$	$0.2337^{+0.024}_{-0.03}$	2760
$t_{FGD}$	$0.06823^{+0.033}_{-0.03}$	$0.09628^{+0.029}_{-0.026}$	3967	$0.01531^{+0.0078}_{-0.0065}$	$0.02118^{+0.0073}_{-0.0059}$	4361	$t_{FGD}$	$0.0054^{+0.0026}_{-0.0024}$	$0.00762^{+0.0024}_{-0.0021}$	4486	$0.22616^{+0.025}_{-0.035}$	$0.26573^{+0.017}_{-0.02}$	3056
$t_{MMD}$	$0.00035^{+0.0002}_{-0.0002}$	$0.0005^{+0.0002}_{-0.00021}$	4803	$0.00011^{+7e-05}_{-6e-05}$	$0.00016^{+7e-05}_{-7e-05}$	6129	$t_{MMD}$	$3e - 05^{+1e-05}_{-2e-05}$	$4e - 05^{+1e-05}_{-2e-05}$	5271	$0.5492^{+0.07}_{-0.098}$	$0.65017^{+0.049}_{-0.055}$	3135
$t_{LLR}$	-	-	-	$2e - 05^{+2e-05}_{-1e-05}$	$3e - 05^{+2e-05}_{-1e-05}$	5340	$t_{LLR}$	-	-	-	-	-	-
$\Sigma_{i \neq j}$ -deformation							pow <sub>+</sub> -deformation						
Statistic	$\epsilon_{95\%CL}$	$\epsilon_{99\%CL}$	$t$ (s)	$\epsilon_{95\%CL}$	$\epsilon_{99\%CL}$	$t$ (s)	Statistic	$\epsilon_{95\%CL}$	$\epsilon_{99\%CL}$	$t$ (s)	$\epsilon_{95\%CL}$	$\epsilon_{99\%CL}$	$t$ (s)
$t_{SW}$	$0.03284^{+0.0083}_{-0.012}$	$0.0452^{+0.0072}_{-0.0081}$	<b>3383</b>	$0.00885^{+0.0026}_{-0.0032}$	$0.01229^{+0.0023}_{-0.0026}$	3289	$t_{SW}$	$0.00063^{+0.00022}_{-0.00027}$	$0.00092^{+0.00019}_{-0.00023}$	3365	$0.01024^{+0.003}_{-0.0035}$	$0.01397^{+0.003}_{-0.0031}$	3009
$t_{KS}$	$1.00292^{+0.00074}_{-0.002}$	$1.00384^{+0.00031}_{-0.0011}$	3763	$0.00669^{+0.0014}_{-0.0019}$	$0.00899^{+0.001}_{-0.0013}$	<b>3252</b>	$t_{KS}$	$0.0069^{+0.0014}_{-0.002}$	$0.00915^{+0.0011}_{-0.0014}$	3261	$0.19595^{+0.03}_{-0.043}$	$0.2337^{+0.024}_{-0.03}$	2760
$t_{SKS}$	$0.03491^{+0.011}_{-0.013}$	$0.04771^{+0.009}_{-0.01}$	3492	$0.01094^{+0.0026}_{-0.0032}$	$0.01482^{+0.0021}_{-0.0023}$	3782	$t_{SKS}$	$0.01118^{+0.0027}_{-0.0032}$	$0.01522^{+0.0022}_{-0.0024}$	3767	$0.22616^{+0.025}_{-0.035}$	$0.26573^{+0.017}_{-0.02}$	3056
$t_{FGD}$	$0.0086^{+0.002}_{-0.0024}$	$0.01178^{+0.0016}_{-0.0018}$	4984	$0.00543^{+0.0025}_{-0.0022}$	$0.00756^{+0.0022}_{-0.0019}$	4416	$t_{FGD}$	$0.0054^{+0.0026}_{-0.0024}$	$0.00762^{+0.0024}_{-0.0021}$	4486	$0.5492^{+0.07}_{-0.098}$	$0.65017^{+0.049}_{-0.055}$	3135
$t_{MMD}$	$0.02632^{+0.013}_{-0.012}$	$0.03677^{+0.012}_{-0.01}$	4795	-	-	-	$t_{MMD}$	$3e - 05^{+1e-05}_{-2e-05}$	$4e - 05^{+1e-05}_{-2e-05}$	5271	-	-	-
$t_{LLR}$	-	-	-	-	-	-	$t_{LLR}$	-	-	-	-	-	-
pow <sub>-</sub> -deformation							$\mathcal{N}$ -deformation						
Statistic	$\epsilon_{95\%CL}$	$\epsilon_{99\%CL}$	$t$ (s)	$\epsilon_{95\%CL}$	$\epsilon_{99\%CL}$	$t$ (s)	Statistic	$\epsilon_{95\%CL}$	$\epsilon_{99\%CL}$	$t$ (s)	$\epsilon_{95\%CL}$	$\epsilon_{99\%CL}$	$t$ (s)
$t_{SW}$	$0.00925^{+5}_{-0.0034}$	$0.01271^{+5}_{-0.0027}$	<b>2942</b>	$0.23992^{+0.03}_{-0.05}$	$0.28403^{+0.022}_{-0.031}$	<b>2619</b>	$t_{SW}$	$0.00063^{+0.00022}_{-0.00027}$	$0.00092^{+0.00019}_{-0.00023}$	3365	$0.01024^{+0.003}_{-0.0035}$	$0.01397^{+0.003}_{-0.0031}$	3009
$t_{KS}$	$0.0069^{+0.0014}_{-0.002}$	$0.00915^{+0.0011}_{-0.0014}$	3261	$0.19595^{+0.03}_{-0.043}$	$0.2337^{+0.024}_{-0.03}$	2760	$t_{KS}$	$0.0069^{+0.0014}_{-0.002}$	$0.00915^{+0.0011}_{-0.0014}$	3261	$0.19595^{+0.03}_{-0.043}$	$0.2337^{+0.024}_{-0.03}$	2760
$t_{SKS}$	$0.01118^{+0.0027}_{-0.0032}$	$0.01522^{+0.0022}_{-0.0024}$	3767	$0.22616^{+0.025}_{-0.035}$	$0.26573^{+0.017}_{-0.02}$	3056	$t_{SKS}$	$0.01118^{+0.0027}_{-0.0032}$	$0.01522^{+0.0022}_{-0.0024}$	3767	$0.22616^{+0.025}_{-0.035}$	$0.26573^{+0.017}_{-0.02}$	3056
$t_{FGD}$	$0.0054^{+0.0026}_{-0.0024}$	$0.00762^{+0.0024}_{-0.0021}$	4486	$0.5492^{+0.07}_{-0.098}$	$0.65017^{+0.049}_{-0.055}$	3135	$t_{FGD}$	$0.0054^{+0.0026}_{-0.0024}$	$0.00762^{+0.0024}_{-0.0021}$	4486	$0.5492^{+0.07}_{-0.098}$	$0.65017^{+0.049}_{-0.055}$	3135
$t_{MMD}$	$0.0054^{+0.0026}_{-0.0024}$	$0.00762^{+0.0024}_{-0.0021}$	4486	-	-	-	$t_{MMD}$	$3e - 05^{+1e-05}_{-2e-05}$	$4e - 05^{+1e-05}_{-2e-05}$	5271	-	-	-
$t_{LLR}$	$3e - 05^{+1e-05}_{-2e-05}$	$4e - 05^{+1e-05}_{-2e-05}$	5271	-	-	-	$t_{LLR}$	-	-	-	-	-	-
$\mathcal{U}$ -deformation							Timing						
Statistic	$\epsilon_{95\%CL}$	$\epsilon_{99\%CL}$	$t$ (s)	$t^{\text{null}}$ (s)	$\epsilon_{95\%CL}$	$\epsilon_{99\%CL}$	Statistic	$\epsilon_{95\%CL}$	$\epsilon_{99\%CL}$	$t$ (s)	$t^{\text{null}}$ (s)	$\epsilon_{95\%CL}$	$\epsilon_{99\%CL}$
$t_{FGD}$	$0.39292^{+0.043}_{-0.06}$	$0.46165^{+0.029}_{-0.038}$	2912	1022	$0.39292^{+0.043}_{-0.06}$	$0.46165^{+0.029}_{-0.038}$	$t_{FGD}$	$0.39292^{+0.043}_{-0.06}$	$0.46165^{+0.029}_{-0.038}$	2912	1022	$0.39292^{+0.043}_{-0.06}$	$0.46165^{+0.029}_{-0.038}$
$t_{LLR}$	-	-	-	-	-	-	$t_{LLR}$	-	-	-	-	-	-
$t_{MMD}$	$0.95249^{+0.13}_{-0.18}$	$1.13574^{+0.077}_{-0.099}$	3196	2276	$0.95249^{+0.13}_{-0.18}$	$1.13574^{+0.077}_{-0.099}$	$t_{MMD}$	$0.95249^{+0.13}_{-0.18}$	$1.13574^{+0.077}_{-0.099}$	3196	2276	$0.95249^{+0.13}_{-0.18}$	$1.13574^{+0.077}_{-0.099}$
$t_{SKS}$	$0.33963^{+0.052}_{-0.08}$	$0.4023^{+0.04}_{-0.052}$	2714	397	$0.33963^{+0.052}_{-0.08}$	$0.4023^{+0.04}_{-0.052}$	$t_{SKS}$	$0.33963^{+0.052}_{-0.08}$	$0.4023^{+0.04}_{-0.052}$	2714	397	$0.33963^{+0.052}_{-0.08}$	$0.4023^{+0.04}_{-0.052}$
$t_{SW}$	$0.414^{+0.054}_{-0.084}$	$0.49011^{+0.037}_{-0.054}$	<b>2594</b>	302	$0.414^{+0.054}_{-0.084}$	$0.49011^{+0.037}_{-0.054}$	$t_{SW}$	$0.414^{+0.054}_{-0.084}$	$0.49011^{+0.037}_{-0.054}$	<b>2594</b>	302	$0.414^{+0.054}_{-0.084}$	$0.49011^{+0.037}_{-0.054}$
$t_{KS}$	$0.01605^{+0.0043}_{-0.0049}$	$0.02144^{+0.0043}_{-0.0046}$	2920	<b>120</b>	$0.01605^{+0.0043}_{-0.0049}$	$0.02144^{+0.0043}_{-0.0046}$	$t_{KS}$	$0.01605^{+0.0043}_{-0.0049}$	$0.02144^{+0.0043}_{-0.0046}$	2920	<b>120</b>	$0.01605^{+0.0043}_{-0.0049}$	$0.02144^{+0.0043}_{-0.0046}$