

**MoG model with  $d = 5$ ,  $q = 3$ , and  $n = m = 10^5$**

| Statistic           | $\mu$ -deformation                                |   |             | $\Sigma_{ii}$ -deformation                        |   |             |
|---------------------|---|---|-------------|---|---|-------------|
|                     | $\epsilon_{95\%CL}$                               | $\epsilon_{99\%CL}$                               | $t$ (s)     | $\epsilon_{95\%CL}$                               | $\epsilon_{99\%CL}$                               | $t$ (s)     |
| $t_{SW}$            | $0.02927^{+0.01}_{-0.0098}$                       | $0.04035^{+0.01}_{-0.0095}$                       | 1681        | $0.00935^{+0.0028}_{-0.0032}$                     | $0.01322^{+0.0026}_{-0.0027}$                     | 1787        |
| $t_{\overline{KS}}$ | <b><math>0.00146^{+0.00055}_{-0.00057}</math></b> | <b><math>0.00202^{+0.00054}_{-0.00055}</math></b> | <b>1351</b> | <b><math>0.00084^{+0.00023}_{-0.00026}</math></b> | <b><math>0.0011^{+0.00023}_{-0.00023}</math></b>  | <b>1394</b> |
| $t_{SKS}$           | $0.01762^{+0.0061}_{-0.0062}$                     | $0.0237^{+0.0059}_{-0.0059}$                      | 1523        | $0.00504^{+0.0012}_{-0.0016}$                     | $0.00694^{+0.0011}_{-0.0012}$                     | 1591        |
| $t_{FGD}$           | $0.03532^{+0.019}_{-0.014}$                       | $0.04753^{+0.017}_{-0.013}$                       | 2364        | $0.01036^{+0.0034}_{-0.0037}$                     | $0.01442^{+0.0029}_{-0.003}$                      | 2518        |
| $t_{MMD}$           | $0.01904^{+0.011}_{-0.0077}$                      | $0.02548^{+0.01}_{-0.0076}$                       | 10489       | $0.00456^{+0.0019}_{-0.0015}$                     | $0.00605^{+0.0017}_{-0.0014}$                     | 11046       |
| $t_{LLR}$           | $0.00024^{+0.00014}_{-0.00013}$                   | $0.00033^{+0.00014}_{-0.00013}$                   | 3539        | $8e-05^{+6e-05}_{-5e-05}$                         | $0.00011^{+6e-05}_{-5e-05}$                       | 3795        |
|                     |   |   |             |   |   |             |
| Statistic           | $\Sigma_{i \neq j}$ -deformation                  |   |             | pow <sub>+</sub> -deformation                     |   |             |
|                     | $\epsilon_{95\%CL}$                               | $\epsilon_{99\%CL}$                               | $t$ (s)     | $\epsilon_{95\%CL}$                               | $\epsilon_{99\%CL}$                               | $t$ (s)     |
| $t_{SW}$            | $0.0184^{+0.0045}_{-0.006}$                       | $0.02579^{+0.0037}_{-0.0045}$                     | <b>1548</b> | $0.00584^{+0.0017}_{-0.002}$                      | $0.00823^{+0.0016}_{-0.0016}$                     | 1647        |
| $t_{\overline{KS}}$ | $1.00067^{+0.00037}_{-6e-05}$                     | $1.00122^{+0.00018}_{-0.00046}$                   | 1612        | <b><math>0.00103^{+0.00032}_{-0.00034}</math></b> | <b><math>0.00138^{+0.00031}_{-0.00031}</math></b> | <b>1377</b> |
| $t_{SKS}$           | $0.01735^{+0.0055}_{-0.0064}$                     | $0.02357^{+0.005}_{-0.0054}$                      | 1731        | $0.00329^{+0.00072}_{-0.00091}$                   | $0.00446^{+0.00063}_{-0.0007}$                    | 1992        |
| $t_{FGD}$           | <b><math>0.00739^{+0.002}_{-0.0024}</math></b>    | <b><math>0.01031^{+0.0017}_{-0.0017}</math></b>   | 2799        | $0.00639^{+0.0021}_{-0.0024}$                     | $0.00883^{+0.0018}_{-0.0019}$                     | 2503        |
| $t_{MMD}$           | $0.0159^{+0.0065}_{-0.0056}$                      | $0.02113^{+0.0057}_{-0.0051}$                     | 11026       | $0.00264^{+0.0011}_{-0.00089}$                    | $0.00349^{+0.001}_{-0.00085}$                     | 14540       |
| $t_{LLR}$           | -   | -   | -           | $0.00012^{+8e-05}_{-9e-05}$                       | $0.00017^{+8e-05}_{-9e-05}$                       | 4452        |
|                     |   |   |             |   |   |             |
| Statistic           | pow <sub>-</sub> -deformation                     |   |             | $\mathcal{N}$ -deformation                        |   |             |
|                     | $\epsilon_{95\%CL}$                               | $\epsilon_{99\%CL}$                               | $t$ (s)     | $\epsilon_{95\%CL}$                               | $\epsilon_{99\%CL}$                               | $t$ (s)     |
| $t_{SW}$            | $0.00606^{+0.0017}_{-0.0021}$                     | $0.00856^{+0.0015}_{-0.0017}$                     | 1649        | $0.13773^{+0.017}_{-0.026}$                       | $0.16305^{+0.012}_{-0.016}$                       | 1344        |
| $t_{\overline{KS}}$ | <b><math>0.00098^{+0.00037}_{-0.00037}</math></b> | <b><math>0.00133^{+0.00035}_{-0.00036}</math></b> | <b>1366</b> | <b><math>0.00454^{+0.00072}_{-0.00082}</math></b> | <b><math>0.00539^{+0.00062}_{-0.00069}</math></b> | <b>1281</b> |
| $t_{SKS}$           | $0.00333^{+0.00084}_{-0.001}$                     | $0.00446^{+0.00075}_{-0.00082}$                   | 2034        | $0.09534^{+0.015}_{-0.02}$                        | $0.11293^{+0.011}_{-0.014}$                       | 1707        |
| $t_{FGD}$           | $0.00659^{+0.002}_{-0.0024}$                      | $0.00905^{+0.0017}_{-0.0017}$                     | 2508        | $0.16354^{+0.02}_{-0.031}$                        | $0.19223^{+0.014}_{-0.018}$                       | 2022        |
| $t_{MMD}$           | $0.00267^{+0.0013}_{-0.0011}$                     | $0.00357^{+0.0012}_{-0.001}$                      | 11378       | $0.21459^{+0.027}_{-0.032}$                       | $0.24752^{+0.021}_{-0.025}$                       | 8643        |
| $t_{LLR}$           | $0.00013^{+9e-05}_{-9e-05}$                       | $0.00018^{+9e-05}_{-8e-05}$                       | 4419        | -   | -   | -           |
|                     |   |   |             |   |   |             |
| Statistic           | $\mathcal{U}$ -deformation                        |   |             | Timing  |   |             |
|                     | $\epsilon_{95\%CL}$                               | $\epsilon_{99\%CL}$                               | $t$ (s)     | $t^{\text{null}}$ (s)                             |   |             |
| $t_{FGD}$           | $0.28233^{+0.035}_{-0.054}$                       | $0.33186^{+0.024}_{-0.03}$                        | 1941        | 2259  |   |             |
| $t_{LLR}$           | -   | -   | -           | -   |   |             |
| $t_{MMD}$           | $0.3715^{+0.045}_{-0.055}$                        | $0.42782^{+0.036}_{-0.043}$                       | 7912        | 16290   |   |             |
| $t_{SKS}$           | $0.16389^{+0.025}_{-0.034}$                       | $0.19413^{+0.019}_{-0.025}$                       | 1681        | 672   |   |             |
| $t_{SW}$            | $0.23671^{+0.03}_{-0.043}$                        | $0.28278^{+0.023}_{-0.028}$                       | 1318        | 363   |   |             |
| $t_{\overline{KS}}$ | <b><math>0.00774^{+0.0011}_{-0.0014}</math></b>   | <b><math>0.00915^{+0.001}_{-0.0012}</math></b>    | <b>1236</b> | <b>77</b>   |   |             |