| source / bin | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| JER | +0.4 | -0.9 | -0.3 | 0.0 | +0.1 | $+0.2$ | $+0.2$ | -0.5 | -0.7 | -0.1 | +0.4 | -0.7 | $+0.7$ | +0.4 | -0.2 | -0.3 |
|  | +0.7 | -0.3 | -0.2 | $+0.8$ | $+0.2$ | +0.1 | $+0.3$ | -0.2 | -0.6 | -0.1 | +0.7 | -0.1 | -0.9 | +0.3 | -0.3 | +1.0 |
| JESAbsoluteMPFBias | $+0.6$ | -0.3 | +0.2 | $+0.2$ | +0.3 | 0.0 | 0.0 | -0.3 | 0.0 | +0.1 | +0.1 | 0.0 | -1.2 | +0.3 | +0.1 | $+0.8$ |
|  | +1.0 | -0.5 | $+0.1$ | -0.1 | $+0.7$ | -0.4 | $+0.3$ | 0.0 | -0.6 | +0.1 | +0.4 | -0.4 | -0.9 | $+0.3$ | -0.1 | $+0.2$ |
| JESAbsoluteScale | -0.5 | -0.5 | +0.4 | 0.0 | +0.7 | -0.1 | +0.1 | -0.1 | $+0.4$ | -0.5 | +0.1 | -0.5 | $+0.2$ | +0.1 | -0.9 | +2.1 |
|  | 0.0 | -0.2 | $+0.2$ | -0.3 | $+0.2$ | -0.2 | $+0.4$ | -0.2 | -0.4 | -0.1 | $+0.4$ | $+0.2$ | $+0.3$ | 0.0 | -0.5 | +1.7 |
| JESAbsoluteStat | +1.2 | -0.1 | -0.8 | -0.2 | +0.1 | 0.0 | $+0.1$ | -0.8 | $+0.3$ | 0.0 | -0.3 | -0.1 | $+0.1$ | -0.3 | -0.8 | -0.5 |
|  | -2.1 | +0.5 | +0.1 | +0.6 | -0.4 | $+0.2$ | $+0.8$ | +0.4 | -0.2 | -0.2 | +0.4 | +0.1 | +0.6 | +0.2 | -0.3 | +1.5 |
| JESFlavourQCD | $+0.4$ | -0.2 | +0.3 | $+0.7$ | +0.5 | -0.3 | -0.1 | $+0.6$ | -0.3 | -0.2 | $+0.5$ | $+0.8$ | -1.1 | +0.3 | $+0.2$ | $+0.7$ |
|  | +0.4 | $+0.2$ | +0.3 | -1.5 | -0.3 | $+0.3$ | $+0.3$ | -0.8 | -0.6 | $+0.2$ | 0.0 | -1.5 | -0.1 | $+0.3$ | $+0.1$ | -0.8 |
| JESFragmentation | -0.4 | -0.4 | +0.6 | 0.0 | 0.0 | $+0.2$ | $+0.6$ | -0.8 | -0.2 | $+0.2$ | -0.3 | $+0.7$ | $+0.2$ | -0.1 | -0.5 | +1.0 |
|  | -0.3 | -0.3 | +0.4 | 0.0 | +0.5 | -0.3 | $+0.2$ | -0.5 | +0.1 | -0.2 | +0.4 | -0.4 | +0.1 | +0.4 | -0.9 | $+0.7$ |
| JESPileUpDataMC | -0.5 | $+0.4$ | +0.3 | +0.4 | -1.0 | -0.2 | -0.1 | 0.0 | -0.1 | -0.1 | $+0.2$ | $+0.1$ | $+0.8$ | $+0.4$ | -0.3 | +2.5 |
|  | $+0.8$ | -0.3 | +0.4 | -0.4 | -0.4 | $+0.2$ | +0.4 | -0.6 | -0.1 | -0.1 | +0.3 | -1.0 | $+0.3$ | -0.4 | -0.5 | +0.9 |
| JESPileUpPtBB | $+0.5$ | -0.6 | +0.2 | $+0.1$ | +0.4 | -0.4 | 0.0 | $+0.3$ | -0.1 | -0.3 | +0.6 | 0.0 | $+0.3$ | -0.3 | -0.3 | +1.2 |
|  | +1.0 | -0.5 | $+0.1$ | -0.3 | $+0.1$ | -0.2 | -0.1 | -0.6 | -0.1 | -0.1 | $+0.3$ | -0.2 | $+0.8$ | -0.7 | -0.4 | $+0.4$ |
| JESPileUpPtEC1 | $+0.8$ | +0.1 | +0.5 | 0.0 | +0.4 | +0.4 | +0.9 | +0.3 | -0.4 | +0.2 | -0.1 | $+0.7$ | -1.7 | -0.6 | -0.3 | +1.2 |
|  | -0.1 | -0.9 | -0.2 | -0.6 | +0.1 | 0.0 | -0.3 | -0.5 | $+0.3$ | $+0.2$ | -0.1 | -0.1 | $+0.9$ | -0.2 | $+0.4$ | -0.8 |
| JESPileUpPtEC2 | 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 |
|  | 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 |
| JESPileUpPtHF | 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 |
|  | 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 |
| JESPileUpPtRef | $+0.6$ | -0.8 | +0.3 | +0.2 | +0.4 | -0.2 | $+0.8$ | 0.0 | $+0.1$ | -0.5 | +1.4 | -0.2 | -1.0 | -0.1 | 0.0 | +1.4 |
|  | -0.3 | +0.3 | -0.7 | +0.4 | +0.2 | +0.1 | 0.0 | -1.1 | 0.0 | -0.4 | +0.8 | -0.9 | +0.4 | +0.1 | -0.6 | $+0.4$ |
| JESRelativeBal | +0.1 | -0.7 | -0.1 | +0.9 | +1.1 | +0.1 | $+0.2$ | +0.1 | -0.2 | 0.0 | +0.4 | -0.2 | +0.1 | -0.4 | -1.7 | +1.9 |
|  | -0.5 | -0.6 | $+0.1$ | -0.5 | +0.1 | 0.0 | 0.0 | -0.5 | -0.3 | $+0.2$ | $+0.4$ | -1.0 | +0.1 | $+0.7$ | 0.0 | +1.7 |
| JESRelativeFSR | -1.1 | -0.3 | +0.5 | 0.0 | +0.4 | +0.1 | 0.0 | -0.4 | -0.3 | $+0.2$ | +0.2 | -0.4 | -0.1 | +0.7 | -0.5 | +1.1 |
|  | +1.4 | -0.9 | +0.3 | -0.3 | +0.2 | -0.2 | -0.1 | +0.6 | -0.5 | -0.1 | +1.0 | -0.6 | $+0.2$ | -0.3 | -1.0 | +2.6 |
| JESRelativeJEREC1 | -0.6 | -0.1 | $+0.1$ | -0.2 | $+0.2$ | +0.3 | 0.0 | 0.0 | 0.0 | -0.3 | -0.1 | 0.0 | 0.0 | $+0.4$ | -0.1 | +0.4 |
|  | -0.2 | -0.2 | $+0.2$ | -0.3 | $+0.3$ | $+0.3$ | -0.1 | -0.1 | $+0.2$ | +0.1 | 0.0 | $+0.2$ | -0.1 | -0.5 | -0.3 | +1.0 |
| JESRelativeJEREC2 | 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 |
|  | 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 |
| JESRelativeJERHF | 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 |
|  | 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 |
| JESRelativePtBB | +1.2 | -0.4 | +0.2 | -0.2 | -0.2 | -0.7 | +0.1 | -0.2 | -0.3 | -0.3 | +1.2 | -0.3 | +0.3 | 0.0 | -0.4 | +0.7 |
|  |  | +0.1 | +0.5 | 0.0 | +0.2 | $+0.2$ | -0.2 | -0.1 | $+0.2$ | 0.0 | +0.1 | -0.2 | -0.4 | +0.1 | -0.6 | +2.2 |
| JESRelativePtEC1 | -0.1 | -0.1 | +0.4 | -0.1 | +0.4 | $+0.3$ | +0.7 | -0.1 | +0.3 | -0.4 | +0.1 | $+0.2$ | -0.2 | -0.5 | -1.2 | 0.0 |
|  | -0.2 | -0.2 | -0.3 | -0.5 | +0.3 | 0.0 | -0.1 | -0.1 | -0.3 | $+0.3$ | 0.0 | +0.1 | -0.3 | $+0.3$ | $+0.5$ | $+0.7$ |
| JESRelativePtEC2 | 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 |
|  | 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 |
| JESRelativePtHF | 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 |
|  | 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 |
| JESRelativeStatEC | -0.3 | $+0.2$ | 0.0 | -0.4 | $+0.4$ | 0.0 | $+0.5$ | -0.2 | -0.1 | -0.5 | -0.1 | $+0.2$ | -0.1 | +0.4 | -0.4 | -0.1 |
|  | -0.7 | -0.4 | +0.2 | -0.4 | +0.5 | +0.1 | $+0.1$ | 0.0 | +0.4 | +0.1 | +0.2 | -0.2 | -0.5 | -0.1 | $+0.2$ | +0.4 |
| JESRelativeStatFSR | -1.1 | +0.1 | +0.1 | +0.2 | 0.0 | -0.1 | +0.1 | -0.4 | +0.1 | -0.1 | $+0.5$ | -0.4 | +0.4 | +0.3 | -0.5 | +0.8 |
|  | +0.6 | -0.8 | $+0.5$ | $+0.2$ | +0.5 | -0.3 | -0.3 | -0.2 | -0.5 | +0.2 | +0.3 | -0.1 | -0.1 | +0.6 | -1.1 | +1.5 |
| JESRelativeStatHF | 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 |
|  | 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 |
| JESSinglePionECAL | +0.1 | -0.2 | -0.1 | -0.5 | +0.4 | 0.0 | 0.0 | -0.3 | -0.1 | -0.1 | -0.1 | -0.5 | $+0.2$ | $+0.2$ | -0.2 | +0.5 |
|  | -1.6 | 0.0 | 0.0 | $+0.4$ | +0.6 | $+0.6$ | -0.1 | $+0.4$ | $+0.2$ | +0.3 | +0.4 | -0.1 | -0.9 | -0.2 | +0.1 | $+0.6$ |

