

# 1 Nominal correlations.

Measurements		CVW <sub>ele</sub> /%	CVW <sub>tau</sub> /%	Stat	Sys1	Sys2	Sys3	Sys4
Aele	10.50 ± 1.00	93.96	0	0	0	0	1.00	0
Bele	13.50 ± 3.00	6.04	0	0	0	0	3.00	0
BLUE <sub>ele</sub>	10.68 ± 0.98	100.00	0	0	0	0	0.98	0

Measurements		CVW <sub>ele</sub> /%	CVW <sub>tau</sub> /%	Stat	Sys1	Sys2	Sys3	Sys4
Atau	9.50 ± 3.00	0	50.00	0	0	3.00	0	0
Btau	14.00 ± 3.00	0	50.00	0	0	0	0	3.00
BLUE <sub>tau</sub>	11.75 ± 2.12	0	100.00	0	0	1.50	0	1.50

Table 1: BLUE's of the combination ( $\chi^2/\text{ndof} = 2.11/2$ ). Values /10000 are displayed. For each input measurement  $i$ , the central value weight CVW or  $\lambda_i^\alpha$  with which that measurement contributes to the BLUE for observable  $\alpha$  is listed.

$$\left( \begin{array}{c|cc} & \text{ele} & \text{tau} \\ \hline \text{ele} & 1.00 & 0 \\ \text{tau} & 0 & 1.00 \end{array} \right)$$

Table 2: Correlations between the BLUE's.

$$\left( \begin{array}{c|cccc} & \text{Aele} & \text{Atau} & \text{Bele} & \text{Btau} \\ \hline \text{Aele} & 1.00 & 0 & 0.45 & 0 \\ \text{Atau} & 0 & 9.00 & 0 & 0 \\ \text{Bele} & 0.45 & 0 & 9.00 & 0 \\ \text{Btau} & 0 & 0 & 0 & 9.00 \end{array} \right)$$

Table 3: Full input covariance between measurements (summed over error sources). Values /100M are displayed.

$$\left( \begin{array}{c|cccc} & \text{Aele} & \text{Atau} & \text{Bele} & \text{Btau} \\ \hline \text{Aele} & 0 & 0 & 0 & 0 \\ \text{Atau} & 0 & 0 & 0 & 0 \\ \text{Bele} & 0 & 0 & 0 & 0 \\ \text{Btau} & 0 & 0 & 0 & 0 \end{array} \right)$$

Table 4: Partial input covariance between measurements. Error source #0: Stat. Values /100M are displayed.

$$\left( \begin{array}{c|cccc} & \text{Aele} & \text{Atau} & \text{Bele} & \text{Btau} \\ \hline \text{Aele} & 0 & 0 & 0 & 0 \\ \text{Atau} & 0 & 0 & 0 & 0 \\ \text{Bele} & 0 & 0 & 0 & 0 \\ \text{Btau} & 0 & 0 & 0 & 0 \end{array} \right)$$

Table 5: Partial input covariance between measurements. Error source #1: Sys1. Values /100M are displayed.

$$\left( \begin{array}{c|cccc} & \text{Aele} & \text{Atau} & \text{Bele} & \text{Btau} \\ \hline \text{Aele} & 0 & 0 & 0 & 0 \\ \text{Atau} & 0 & 9.00 & 0 & 0 \\ \text{Bele} & 0 & 0 & 0 & 0 \\ \text{Btau} & 0 & 0 & 0 & 0 \end{array} \right)$$

Table 6: Partial input covariance between measurements. Error source #2: Sys2. Values /100M are displayed.

$$\left( \begin{array}{c|cccc} & \text{Aele} & \text{Atau} & \text{Bele} & \text{Btau} \\ \hline \text{Aele} & 1.00 & 0 & 0.45 & 0 \\ \text{Atau} & 0 & 0 & 0 & 0 \\ \text{Bele} & 0.45 & 0 & 9.00 & 0 \\ \text{Btau} & 0 & 0 & 0 & 0 \end{array} \right)$$

Table 7: Partial input covariance between measurements. Error source #3: Sys3. Values /100M are displayed.

$$\left( \begin{array}{c|cccc} & \text{Aele} & \text{Atau} & \text{Bele} & \text{Btau} \\ \hline \text{Aele} & 0 & 0 & 0 & 0 \\ \text{Atau} & 0 & 0 & 0 & 0 \\ \text{Bele} & 0 & 0 & 0 & 0 \\ \text{Btau} & 0 & 0 & 0 & 9.00 \end{array} \right)$$

Table 8: Partial input covariance between measurements. Error source #4: Sys4. Values /100M are displayed.

## 2 Modified correlations.

### 2.1 Zero correlations.

Measurements	CVW <sub>ele</sub> /%	CVW <sub>tau</sub> /%	Stat	Sys1	Sys2	Sys3	Sys4
Aele 10.50 ± 1.00	90.00	0	0	0	0	1.00	0
Bele 13.50 ± 3.00	10.00	0	0	0	0	3.00	0
BLUE <sub>ele</sub> 10.80 ± 0.95	100.00	0	0	0	0	0.95	0

Measurements	CVW <sub>ele</sub> /%	CVW <sub>tau</sub> /%	Stat	Sys1	Sys2	Sys3	Sys4
Atau 9.50 ± 3.00	0	50.00	0	0	3.00	0	0
Btau 14.00 ± 3.00	0	50.00	0	0	0	0	3.00
BLUE <sub>tau</sub> 11.75 ± 2.12	0	100.00	0	0	1.50	0	1.50

Table 9: BLUE's of the combination ( $\chi^2/\text{ndof} = 2.02/2$ ). Values /10000 are displayed. For each input measurement  $i$ , the central value weight CVW or  $\lambda_i^\alpha$  with which that measurement contributes to the BLUE for observable  $\alpha$  is listed.

$$\left( \begin{array}{c|cc} & \text{ele} & \text{tau} \\ \hline \text{ele} & 1.00 & 0 \\ \text{tau} & 0 & 1.00 \end{array} \right)$$

Table 10: Correlations between the BLUE's.

$$\left( \begin{array}{c|cccc} & \text{Aele} & \text{Atau} & \text{Bele} & \text{Btau} \\ \hline \text{Aele} & 1.00 & 0 & 0 & 0 \\ \text{Atau} & 0 & 9.00 & 0 & 0 \\ \text{Bele} & 0 & 0 & 9.00 & 0 \\ \text{Btau} & 0 & 0 & 0 & 9.00 \end{array} \right)$$

Table 11: Full input covariance between measurements (summed over error sources). Values /100M are displayed.

$$\left( \begin{array}{c|cccc} & \text{Aele} & \text{Atau} & \text{Bele} & \text{Btau} \\ \hline \text{Aele} & 0 & 0 & 0 & 0 \\ \text{Atau} & 0 & 0 & 0 & 0 \\ \text{Bele} & 0 & 0 & 0 & 0 \\ \text{Btau} & 0 & 0 & 0 & 0 \end{array} \right)$$

Table 12: Partial input covariance between measurements. Error source #0: Stat. Values /100M are displayed.

$$\left( \begin{array}{c|cccc} & \text{Aele} & \text{Atau} & \text{Bele} & \text{Btau} \\ \hline \text{Aele} & 0 & 0 & 0 & 0 \\ \text{Atau} & 0 & 0 & 0 & 0 \\ \text{Bele} & 0 & 0 & 0 & 0 \\ \text{Btau} & 0 & 0 & 0 & 0 \end{array} \right)$$

Table 13: Partial input covariance between measurements. Error source #1: Sys1. Values /100M are displayed.

$$\left( \begin{array}{c|cccc} & \text{Aele} & \text{Atau} & \text{Bele} & \text{Btau} \\ \hline \text{Aele} & 0 & 0 & 0 & 0 \\ \text{Atau} & 0 & 9.00 & 0 & 0 \\ \text{Bele} & 0 & 0 & 0 & 0 \\ \text{Btau} & 0 & 0 & 0 & 0 \end{array} \right)$$

Table 14: Partial input covariance between measurements. Error source #2: Sys2. Values /100M are displayed.

$$\left( \begin{array}{c|cccc} & \text{Aele} & \text{Atau} & \text{Bele} & \text{Btau} \\ \hline \text{Aele} & 1.00 & 0 & 0 & 0 \\ \text{Atau} & 0 & 0 & 0 & 0 \\ \text{Bele} & 0 & 0 & 9.00 & 0 \\ \text{Btau} & 0 & 0 & 0 & 0 \end{array} \right)$$

Table 15: Partial input covariance between measurements. Error source #3: Sys3. Values /100M are displayed.

$$\left( \begin{array}{c|cccc} & \text{Aele} & \text{Atau} & \text{Bele} & \text{Btau} \\ \hline \text{Aele} & 0 & 0 & 0 & 0 \\ \text{Atau} & 0 & 0 & 0 & 0 \\ \text{Bele} & 0 & 0 & 0 & 0 \\ \text{Btau} & 0 & 0 & 0 & 9.00 \end{array} \right)$$

Table 16: Partial input covariance between measurements. Error source #4: Sys4. Values /100M are displayed.

## Appendix A1. Input data.

```

1 #=====
2 #---- BlueFin input data file -----
3 #=====
4
5 # The file is expected to have the following format.
6 # Blank lines and lines with only empty spaces are ignored.
7 # Lines starting by '#' are reserved for comments and are ignored.
8 # Data lines are composed of fields separated by one or more empty spaces.
9 # Fields cannot contain empty spaces, with the exception of the title line.
10
11 # The next line must have 2 fields: 'TITLE' and the title of the
12 # BlueFin combination, which must be enclosed within double quotes
13 # and may contain only alphanumeric characters or spaces or hyphens.
14 TITLE "W branching ratio Ex2p15"
15
16 # The next line must have 2 fields: 'NOBS' and the number of observables.
17 NOBS 2
18
19 # The next line must have 2 fields: 'NMEA' and the number of measurements.
20 NMEA 4
21
22 # The next line must have 2 fields: 'NERR' and the number of error sources.
23 NERR 5
24
25 # The next NERR+3 lines must have NMEA+1 fields in this format:
26 # - in the 1st line: 'MEANAME' followed by NMEA distinct measurement names
27 #   (measurement names may contain only alphanumeric characters or spaces);
28 # - in the 2nd line: 'OBSNAME' followed by the NMEA names (with NOBS distinct
29 #   values) of the observables measured by the corresponding measurements
30 #   (observable names may contain only alphanumeric characters or spaces
31 #   and should preferably be at most 3 characters long);
32 # - in the 3rd line: 'MEAVAL' followed by the NMEA measured central values;
33 # - in each of the last NERR lines: the error source name followed by the
34 #   NMEA partial errors for each measurement due to the given error source
35 #   (error source names may contain only alphanumeric characters or spaces).
36 MEANAME   Aele   Atau   Bele   Btau
37 OBSNAME    ele    tau    ele    tau
38 MEAVAL  105000  95000  135000  140000
39 Stat      0       0       0       0
40 Sys1      0       0       0       0
41 Sys2      0   30000   0       0
42 Sys3    10000     0   30000     0
43 Sys4      0       0       0   30000
44
45 # The next NMEA*(NMEA-1)/2+1 rows must have NERR+2 fields in this format:
46 # - in the 1st line: 'CMEA1' 'CMEA2' (correlations between 2 measurements)
47 #   followed by the NERR error source names in the same order used above;
48 # - in each of the NMEA*(NMEA-1)/2 last lines: the names of two distinct
49 #   measurements followed by the NERR correlations between the partial

```

```
50 # errors on the two measurements due to corresponding error source.
51 # Measurements must appear in the same order listed above.
52 CMEA1 CMEA2 Stat Sys1 Sys2 Sys3 Sys4
53 AeLe Atau 0 0 0 0 0
54 AeLe BeLe 0 0 0 .15 0
55 AeLe Btau 0 0 0 0 0
56 Atau BeLe 0 0 0 0 0
57 Atau Btau 0 0 0 .15 0
58 BeLe Btau 0 0 0 0 0
```

Input data file: Ex2\_p15.bfin.