1   Nominal correlations.

Measurements		CVW$_{ele}$/%	CVW$_{tau}$/%	Stat	Sys1	Sys2	Sys3	Sys4
Aele	10.50 ± 1.00	86.70	0	0	0	0	1.00	0
Bele	13.50 ± 3.00	13.30	0	0	0	0	3.00	0
BLUE $_{ele}$	10.90 ± 0.90	100.00	0	0	0	0	0.90	0

Measurements		CVW$_{ele}$/%	CVW$_{tau}$/%	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 $_{tau}$	11.75 ± 2.12	0	100.00	0	0	1.50	0	1.50

Table 1: BLUE's of the combination (χ^2/ndof= 1.95/2). Values /10000 are displayed. For each input measurement i, the central value weight CVW or λ_i^α with which that measurement contributes to the BLUE for observable α 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.

$$\begin{pmatrix} & \text{Aele} & \text{Atau} & \text{Bele} & \text{Btau} \\ \hline \text{Aele} & 0 & 0 & 0 & 0 \\ \text{Atau} & 0 & 0 & 0 & 0 \\ \text{Bele} & 0 & 0 & 0 & 0 \\ \text{Btau} & 0 & 0 & 0 & 0 \end{pmatrix}$$

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

$$\begin{pmatrix} & \text{Aele} & \text{Atau} & \text{Bele} & \text{Btau} \\ \hline \text{Aele} & 0 & 0 & 0 & 0 \\ \text{Atau} & 0 & 9.00 & 0 & 0 \\ \text{Bele} & 0 & 0 & 0 & 0 \\ \text{Btau} & 0 & 0 & 0 & 0 \end{pmatrix}$$

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

$$\begin{pmatrix} & \text{Aele} & \text{Atau} & \text{Bele} & \text{Btau} \\ \hline \text{Aele} & 1.00 & 0 & -0.45 & 0 \\ \text{Atau} & 0 & 0 & 0 & 0 \\ \text{Bele} & -0.45 & 0 & 9.00 & 0 \\ \text{Btau} & 0 & 0 & 0 & 0 \end{pmatrix}$$

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

$$\begin{pmatrix} & \text{Aele} & \text{Atau} & \text{Bele} & \text{Btau} \\ \hline \text{Aele} & 0 & 0 & 0 & 0 \\ \text{Atau} & 0 & 0 & 0 & 0 \\ \text{Bele} & 0 & 0 & 0 & 0 \\ \text{Btau} & 0 & 0 & 0 & 9.00 \end{pmatrix}$$

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

2   Modified correlations.

2.1   Zero correlations.

Measurements		CVW$_\text{ele}$/%	CVW$_\text{tau}$/%	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 $_\text{ele}$	10.80 ± 0.95	100.00	0	0	0	0	0.95	0

Measurements		CVW$_\text{ele}$/%	CVW$_\text{tau}$/%	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 $_\text{tau}$	11.75 ± 2.12	0	100.00	0	0	1.50	0	1.50

Table 9: BLUE's of the combination (χ^2/ndof= 2.02/2). Values /10000 are displayed. For each input measurement i, the central value weight CVW or λ_i^α with which that measurement contributes to the BLUE for observable α is listed.

$$\begin{pmatrix} & \text{ele} & \text{tau} \\ \hline \text{ele} & 1.00 & 0 \\ \text{tau} & 0 & 1.00 \end{pmatrix}$$

Table 10: Correlations between the BLUE's.

$$\begin{pmatrix} & \text{Aele} & \text{Atau} & \text{Bele} & \text{Btau} \\ \hline \text{Aele} & 1.00 & 0 & 0 & 0 \\ \text{Atau} & 0 & 9.00 & 0 & 0 \\ \text{Bele} & 0 & 0 & 9.00 & 0 \\ \text{Btau} & 0 & 0 & 0 & 9.00 \end{pmatrix}$$

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

$$\begin{pmatrix} \begin{array}{c|cccc} & \text{Aele} & \text{Atau} & \text{Bele} & \text{Btau} \\ \hline \text{Aele} & 0 & 0 & 0 & 0 \\ \text{Atau} & 0 & 0 & 0 & 0 \\ \text{Bele} & 0 & 0 & 0 & 0 \\ \text{Btau} & 0 & 0 & 0 & 0 \end{array} \end{pmatrix}$$

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

$$\begin{pmatrix} \begin{array}{c|cccc} & \text{Aele} & \text{Atau} & \text{Bele} & \text{Btau} \\ \hline \text{Aele} & 0 & 0 & 0 & 0 \\ \text{Atau} & 0 & 0 & 0 & 0 \\ \text{Bele} & 0 & 0 & 0 & 0 \\ \text{Btau} & 0 & 0 & 0 & 0 \end{array} \end{pmatrix}$$

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

$$\begin{pmatrix} \begin{array}{c|cccc} & \text{Aele} & \text{Atau} & \text{Bele} & \text{Btau} \\ \hline \text{Aele} & 0 & 0 & 0 & 0 \\ \text{Atau} & 0 & 9.00 & 0 & 0 \\ \text{Bele} & 0 & 0 & 0 & 0 \\ \text{Btau} & 0 & 0 & 0 & 0 \end{array} \end{pmatrix}$$

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

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

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

$$\begin{pmatrix} & \text{Aele} & \text{Atau} & \text{Bele} & \text{Btau} \\ \hline \text{Aele} & 0 & 0 & 0 & 0 \\ \text{Atau} & 0 & 0 & 0 & 0 \\ \text{Bele} & 0 & 0 & 0 & 0 \\ \text{Btau} & 0 & 0 & 0 & 9.00 \end{pmatrix}$$

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 Ex2m15"
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_m15.bfin`.