$$\langle\langle a,b\rangle,\langle c,d\rangle\rangle$$

$$(A \times B) \times (C \times D)$$

$$\langle\langle\langle a,b\rangle,c\rangle,d\rangle$$

$$((A \times B) \times C) \times D \xrightarrow{\mathrm{br}_{A\times B,C,D}} (A \times B) \times (C \times D) \xrightarrow{\mathrm{br}_{A,B,C\times D}} (A \times (B \times (C \times D)))$$

$$\langle a,\langle b,\langle c,d\rangle\rangle\rangle$$

$$\downarrow \mathrm{br}_{A,B,C}\times\mathrm{Id}_D$$

$$\uparrow \mathrm{Id}_A\times\mathrm{br}_{B,C,D}$$

$$(A \times (B \times C)) \times D \xrightarrow{\mathrm{br}_{A,B\times C,D}} A \times ((B \times C) \times D)$$

$$\langle\langle a,\langle b,c\rangle\rangle,d\rangle \longmapsto \langle a,\langle\langle b,c\rangle,d\rangle\rangle$$