

**Figure S1: Relative contribution of slip systems for Model-A (a) in single scale VPSC simulation
(b) in multiscale simulation with quartz RDE rheologically weaker than the HEM (Fig.7a,b,c in the main text)
(c) in multiscale simulation with quartz RDE rheologically stronger than the HEM (Fig.7g,h,i in the main text).**
Note that while the slip activity may differ in each cases, the relative contribution of each slip system is not significantly affected by partitioned flow. Basal $\langle a \rangle$ slip remains dominant in all cases.

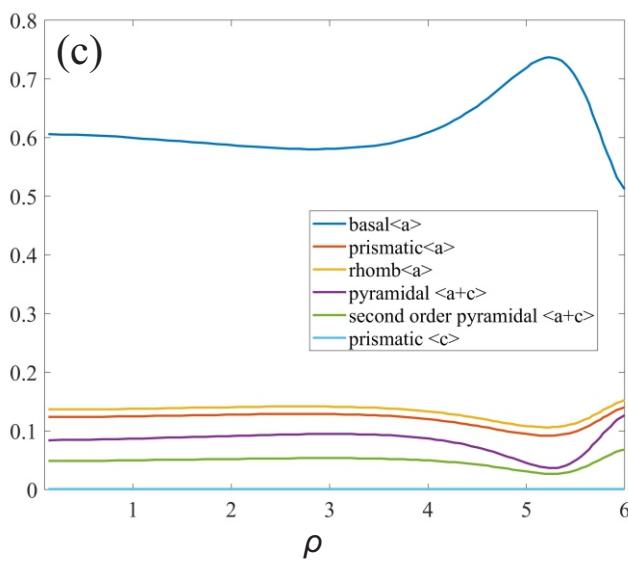
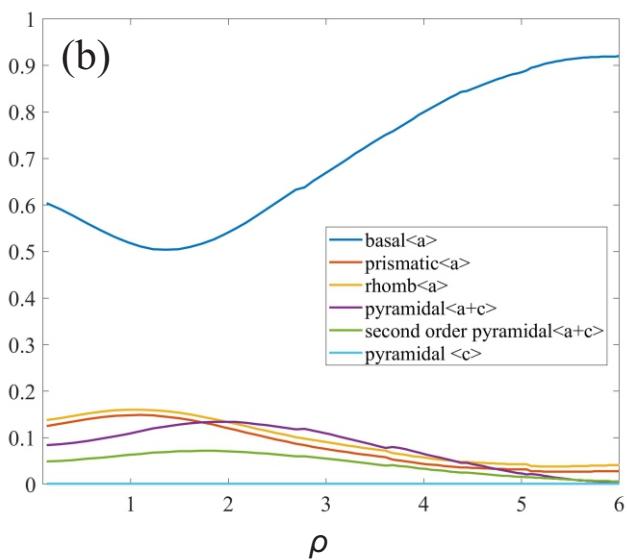
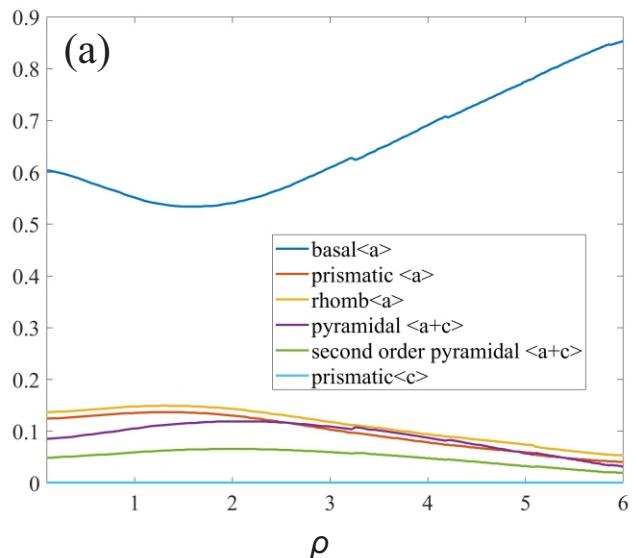
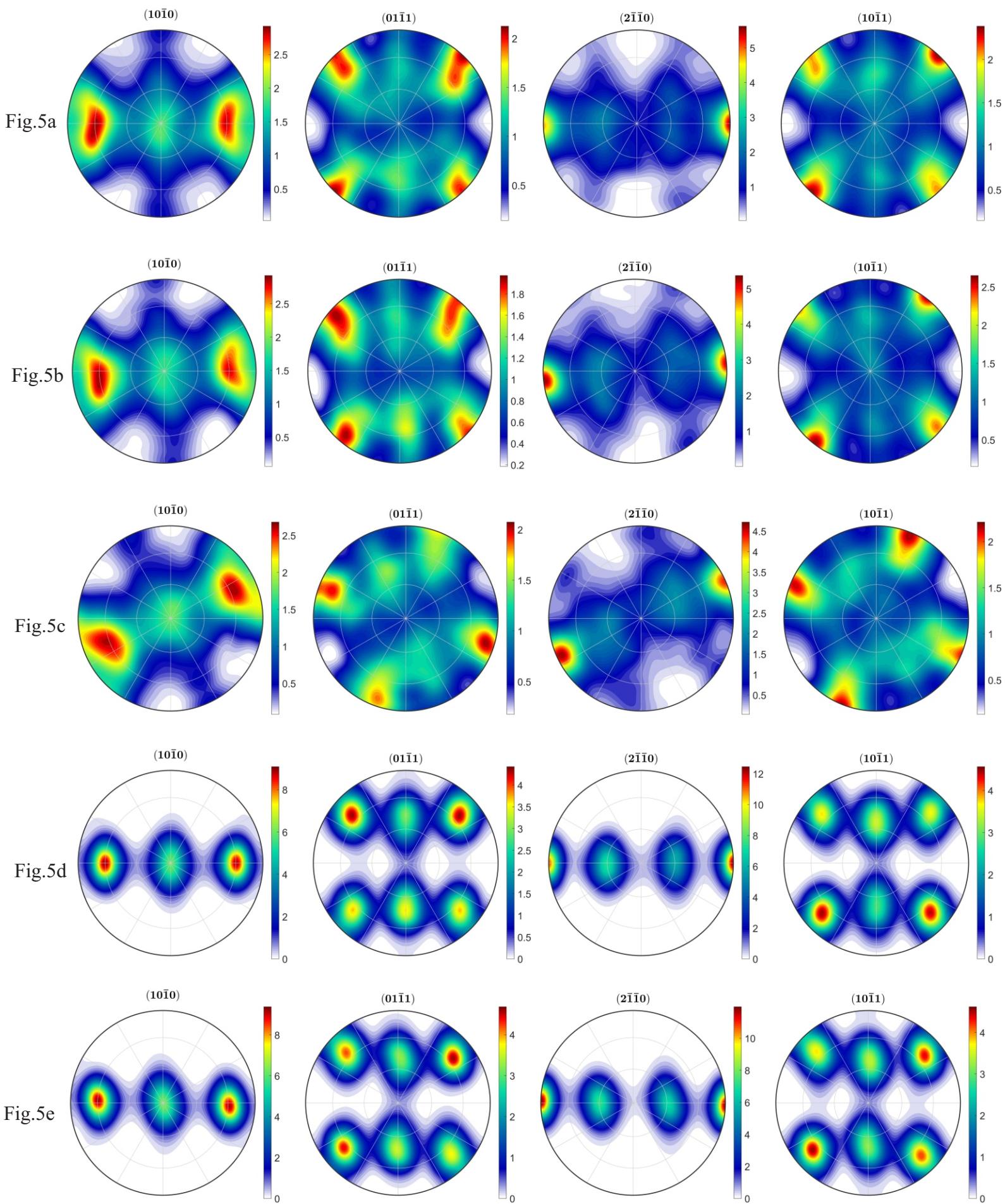
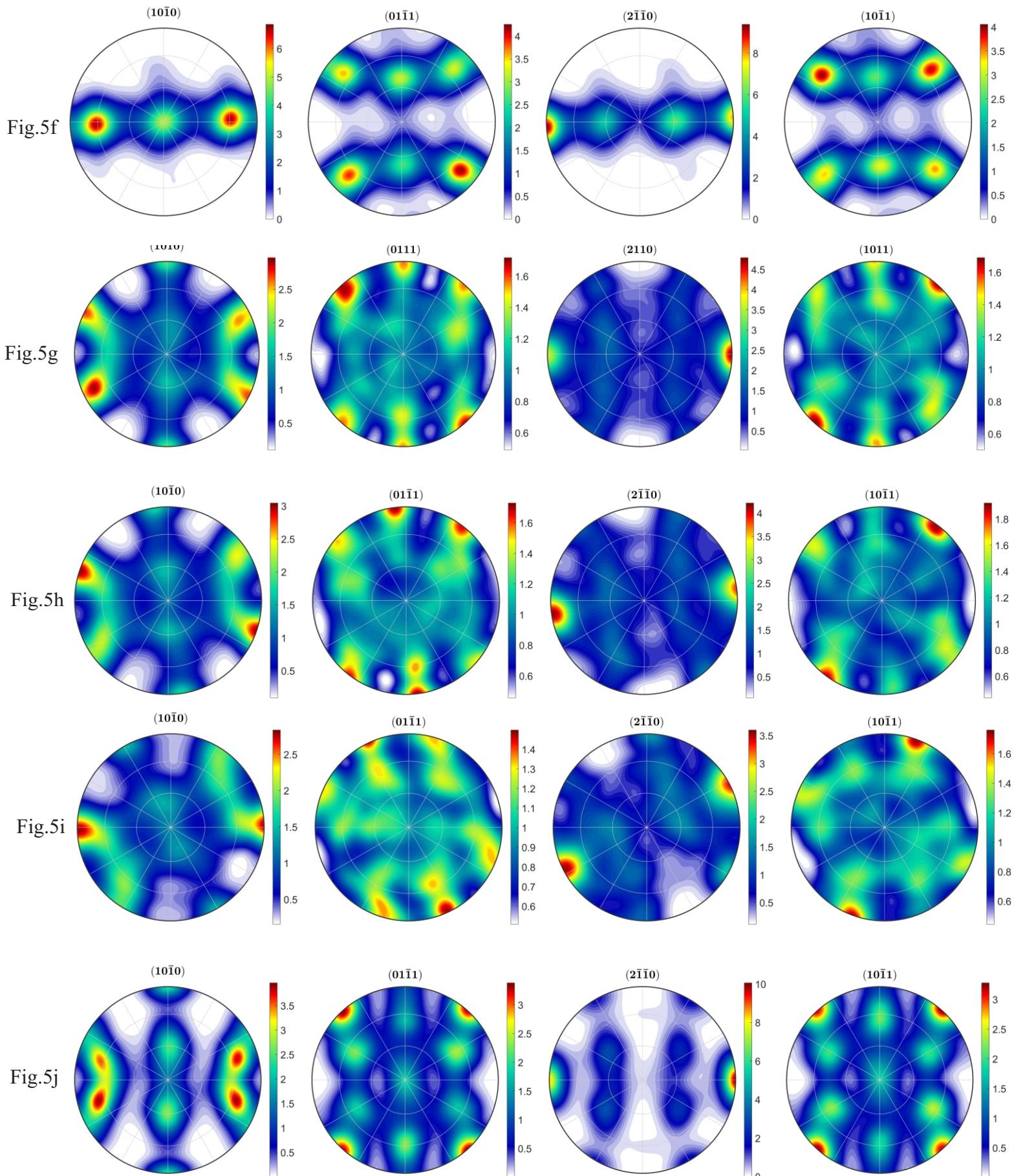
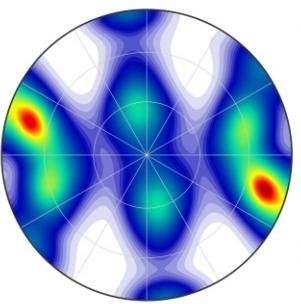


Figure S2: Pole figures of crystal directions (10-10), (01-11), (2-1-10) and (10-11) for Figs. 5-9 in the main text.

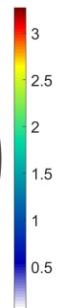
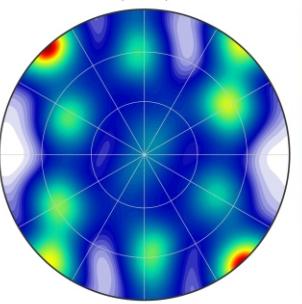




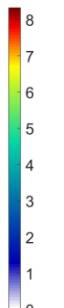
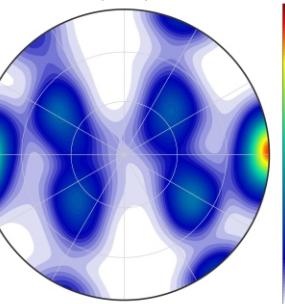
($10\bar{1}0$)



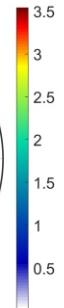
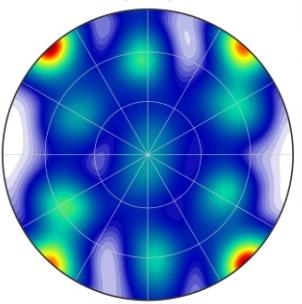
($01\bar{1}1$)



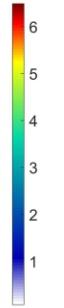
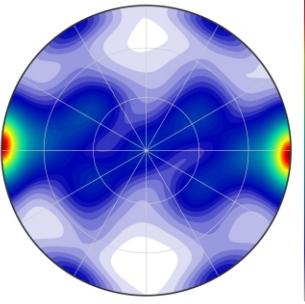
($2\bar{1}\bar{1}0$)



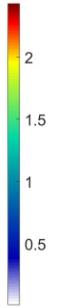
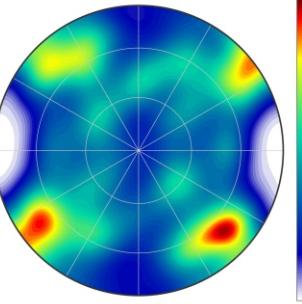
($10\bar{1}1$)



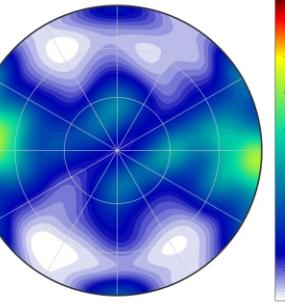
($10\bar{1}0$)



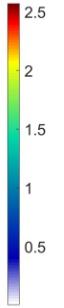
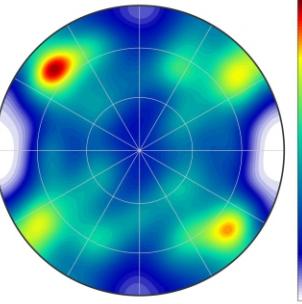
($01\bar{1}1$)



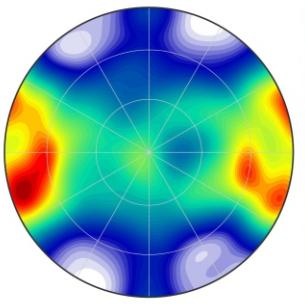
($2\bar{1}\bar{1}0$)



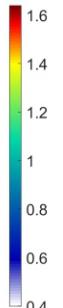
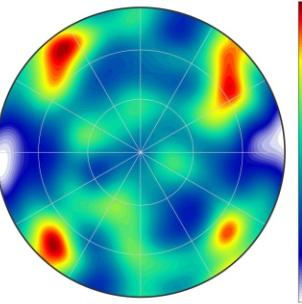
($10\bar{1}1$)



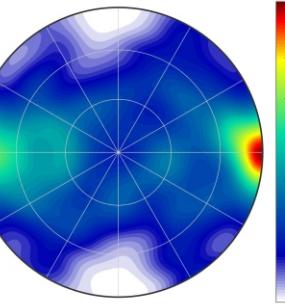
($10\bar{1}0$)



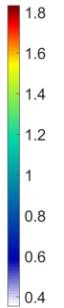
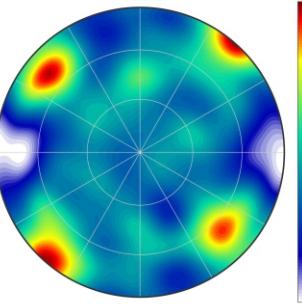
($01\bar{1}1$)



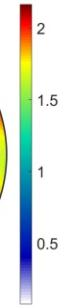
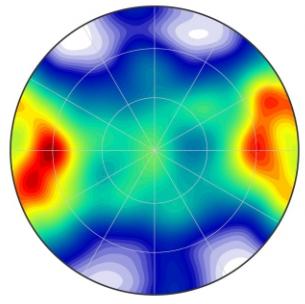
($2\bar{1}\bar{1}0$)



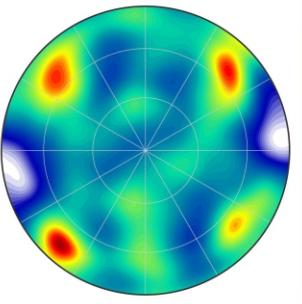
($10\bar{1}1$)



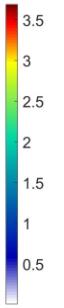
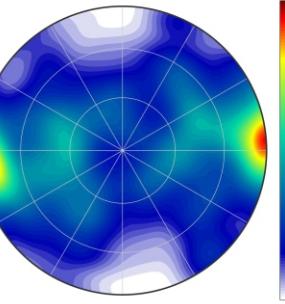
($10\bar{1}0$)



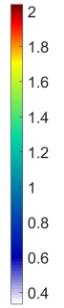
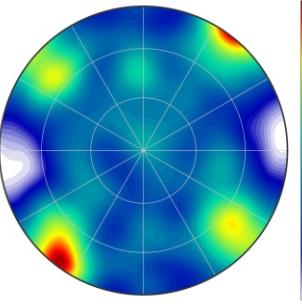
($01\bar{1}1$)



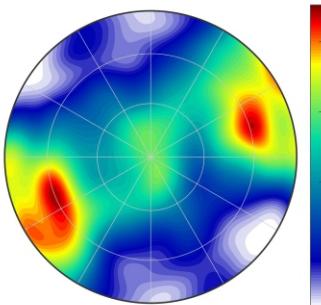
($2\bar{1}\bar{1}0$)



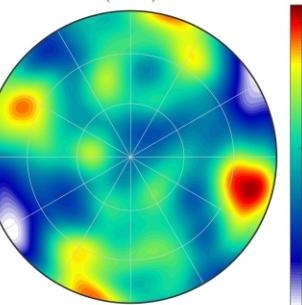
($10\bar{1}1$)



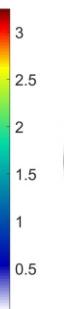
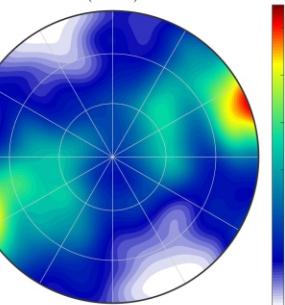
($10\bar{1}0$)



($01\bar{1}1$)



($2\bar{1}\bar{1}0$)



($10\bar{1}1$)

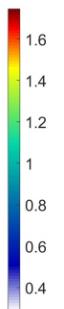
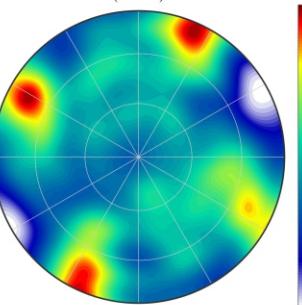
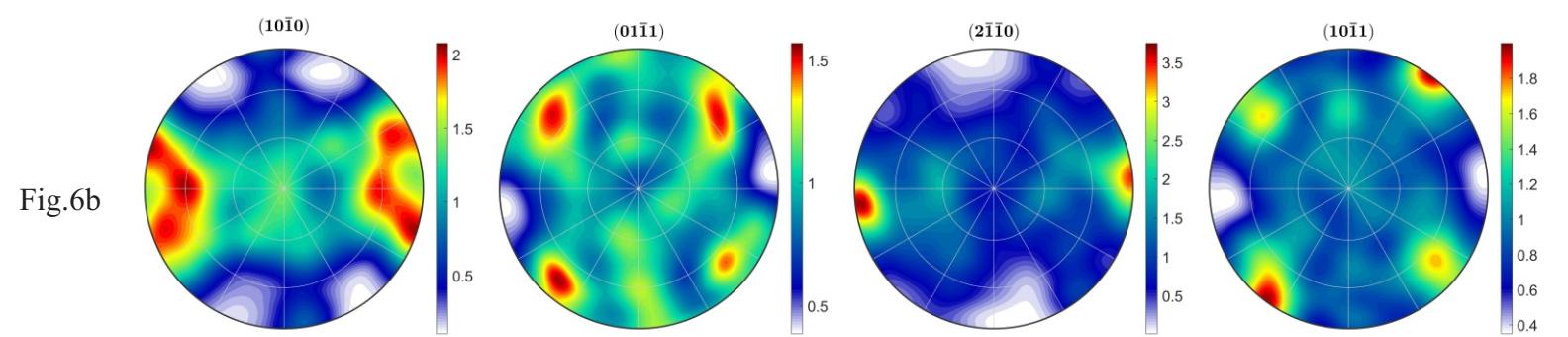
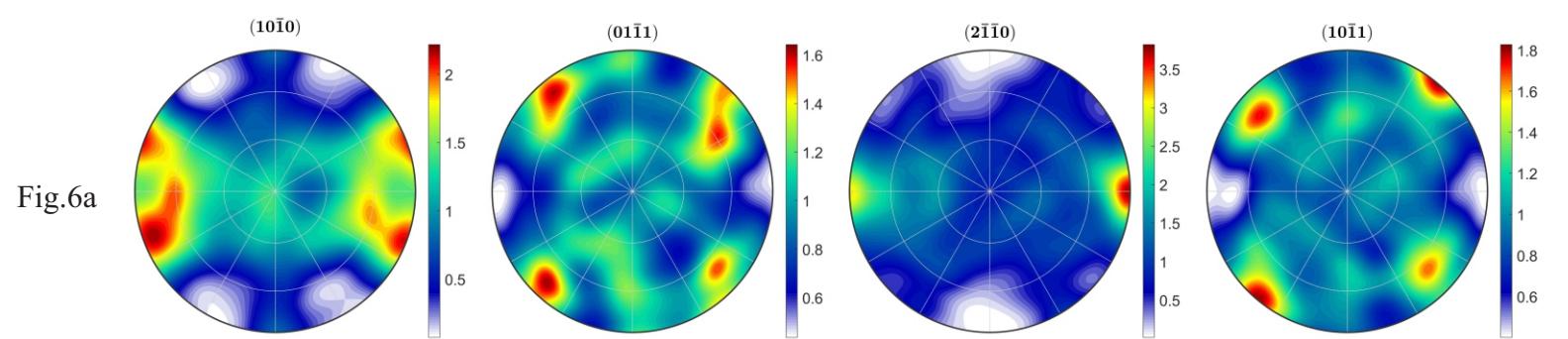
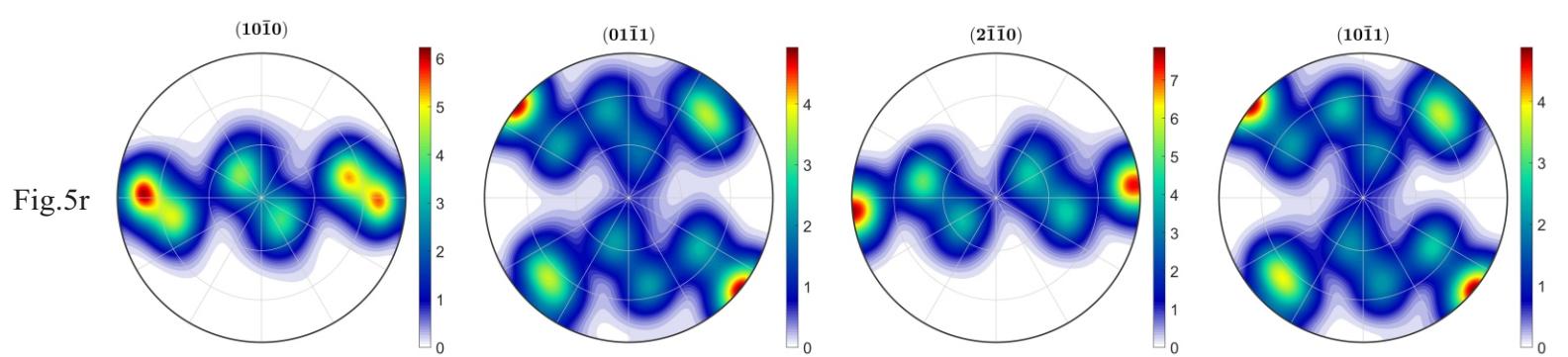
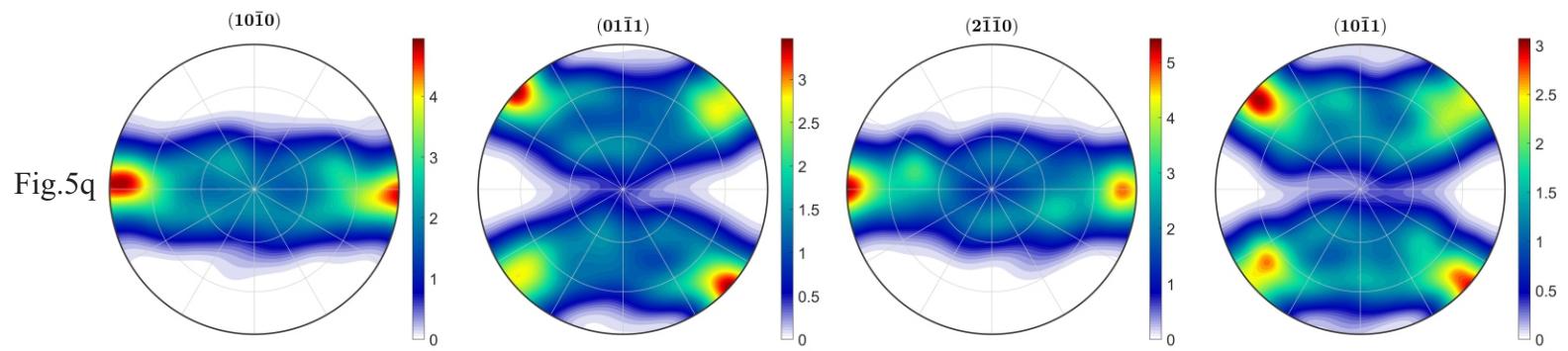
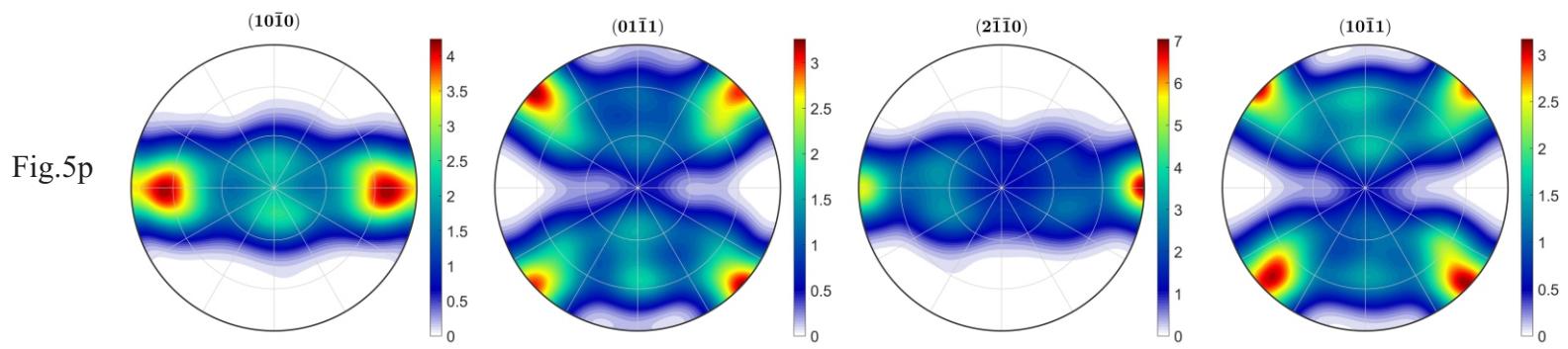
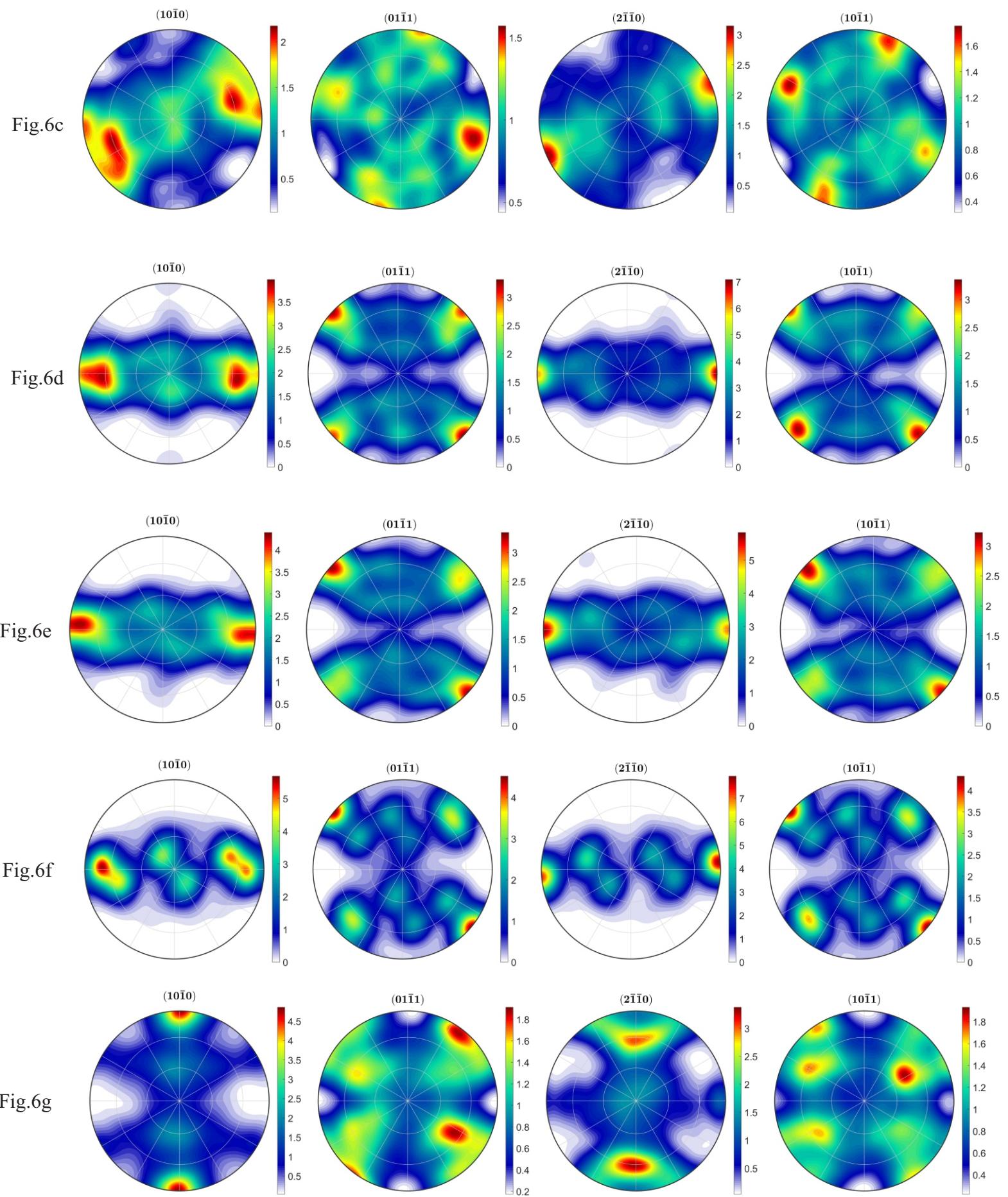
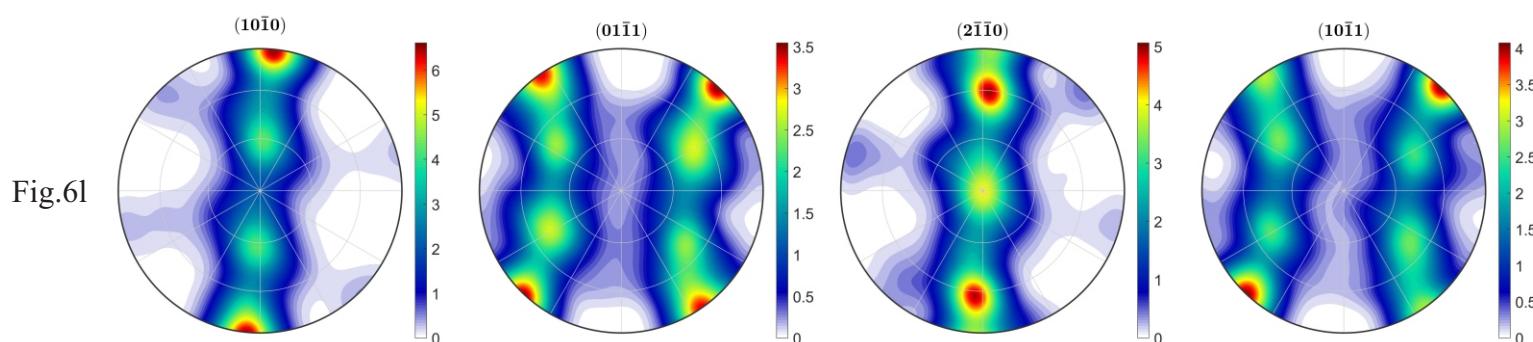
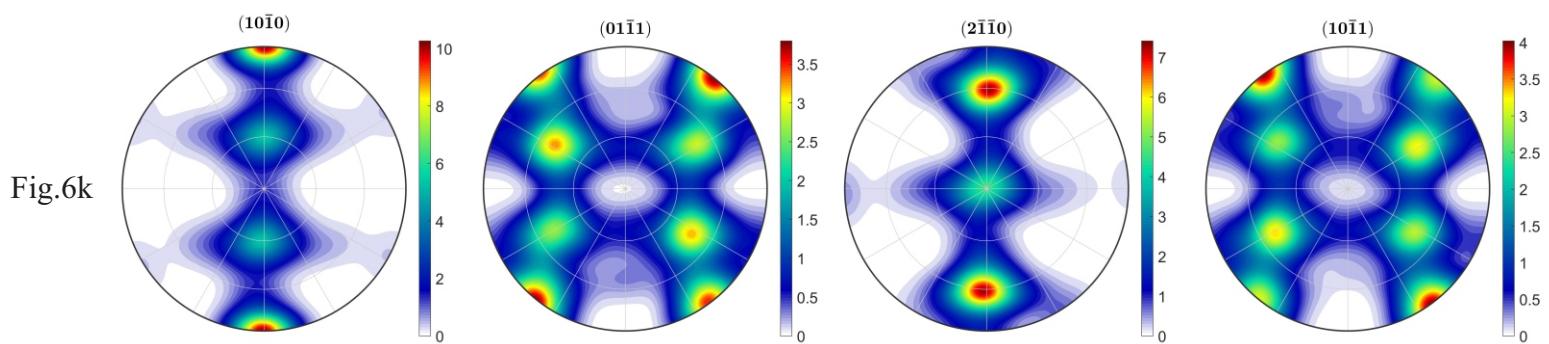
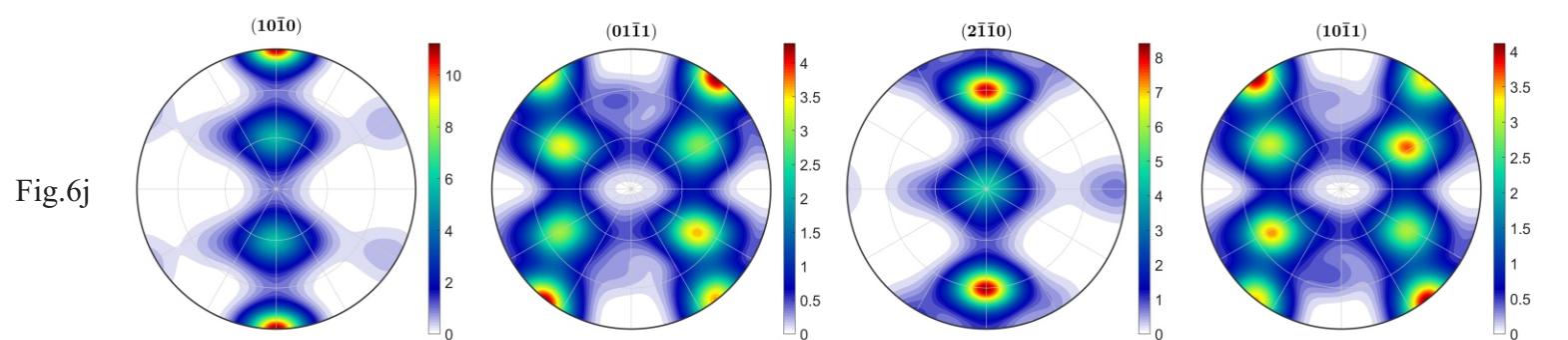
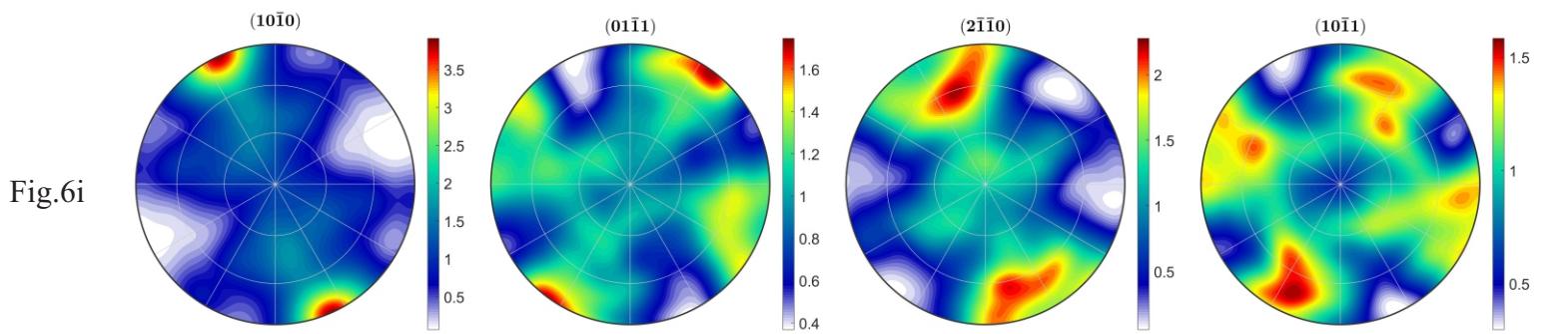
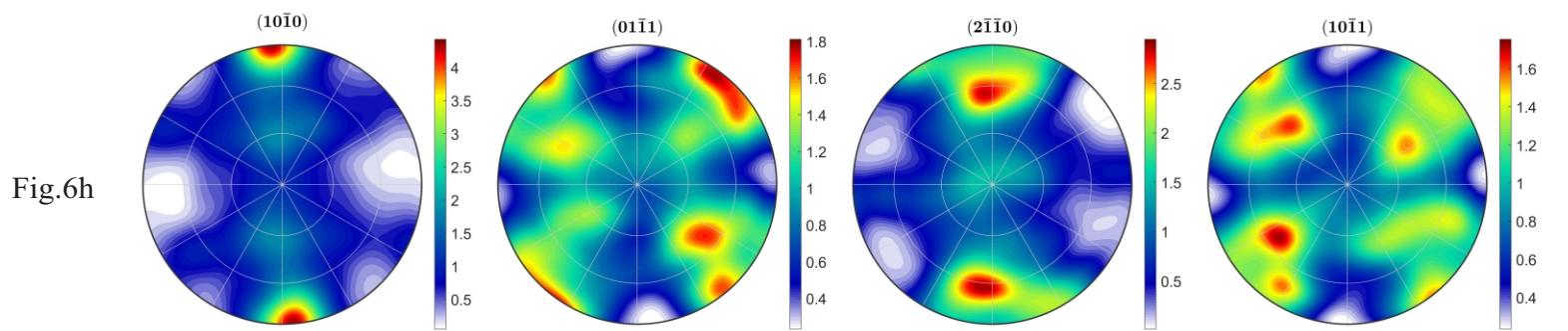
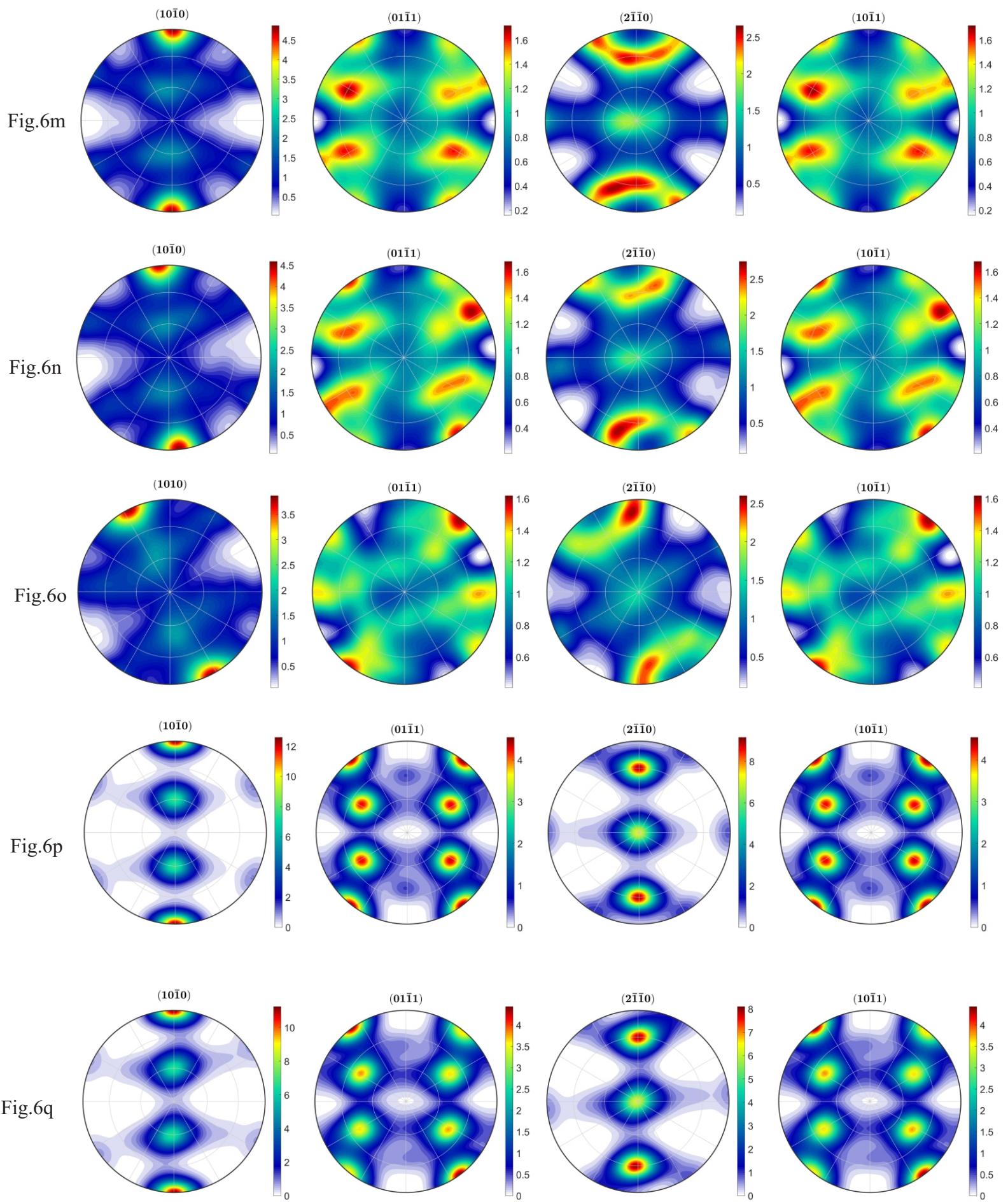


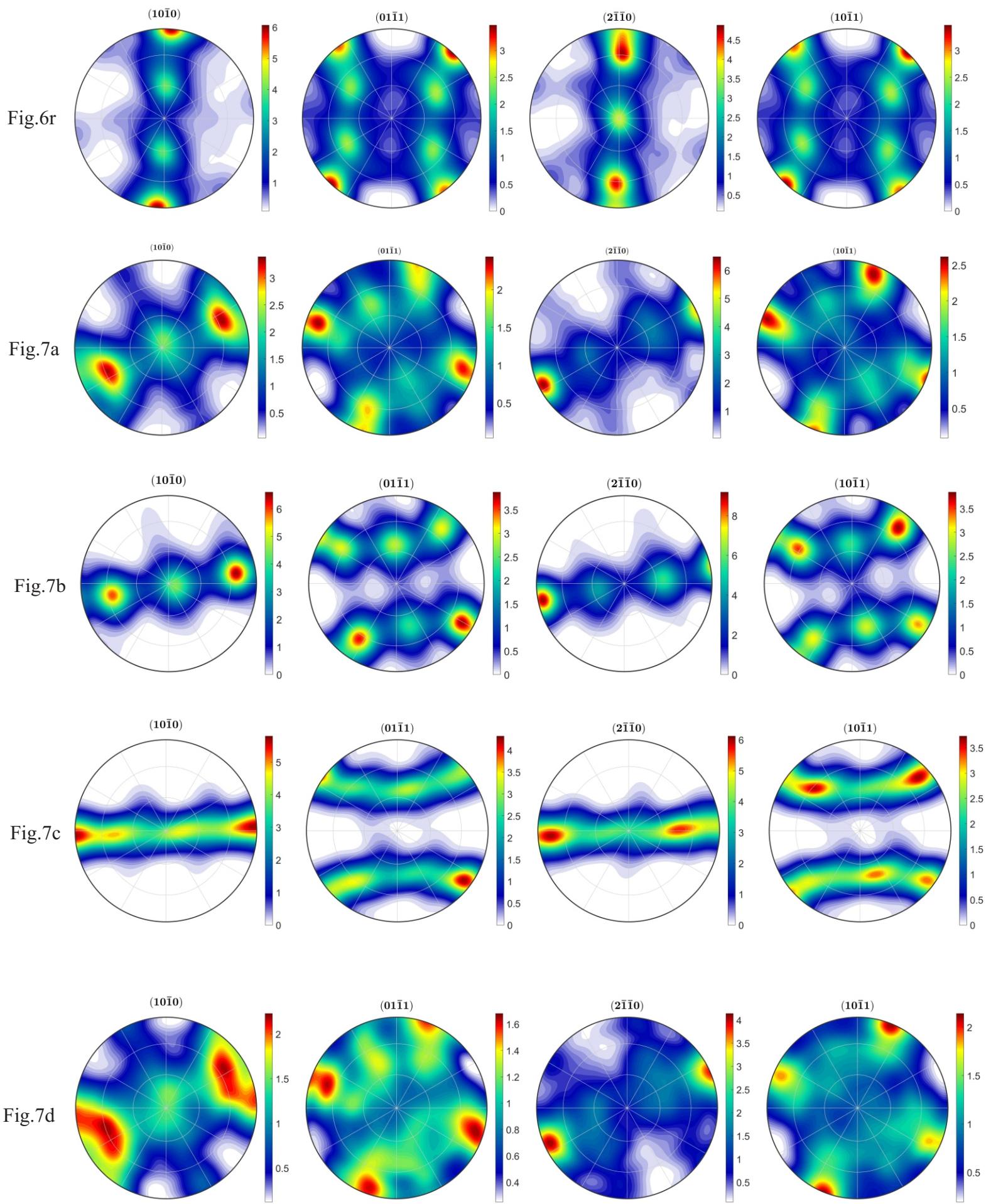
Fig.5o











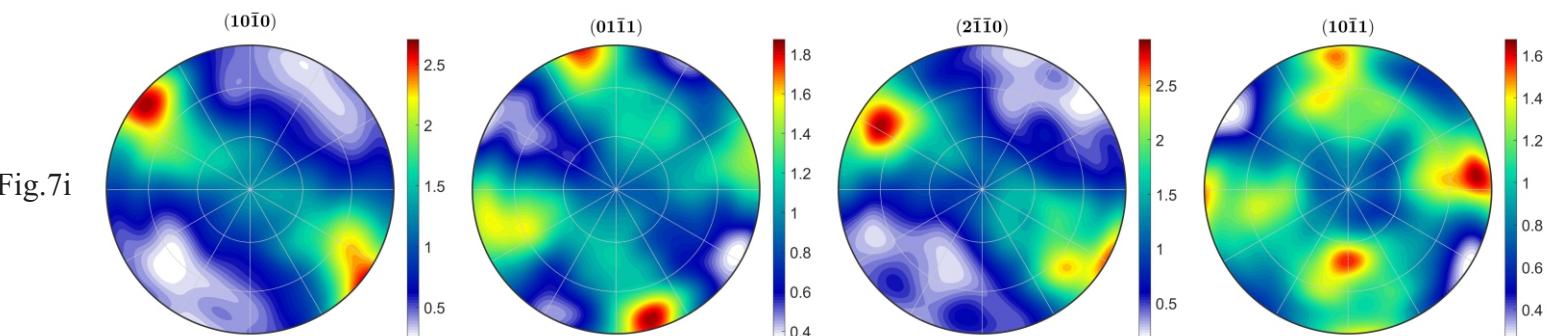
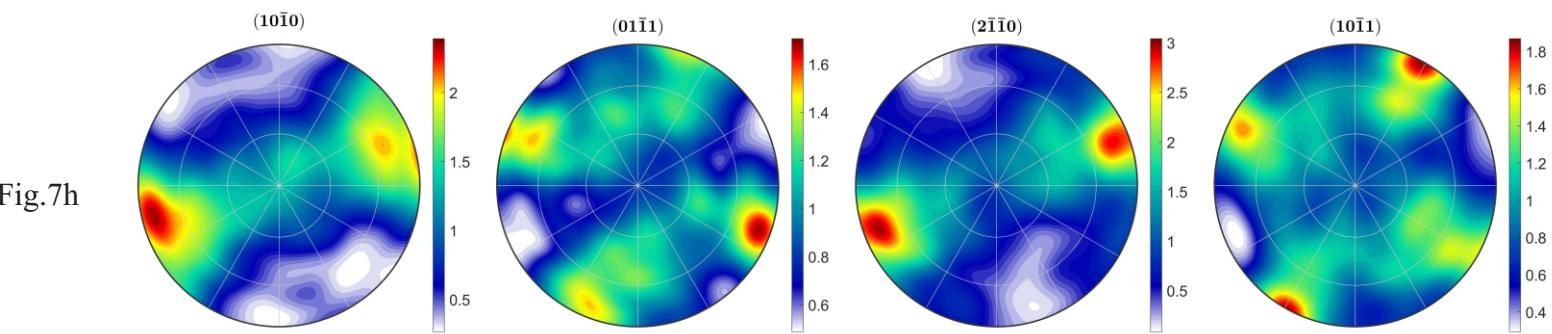
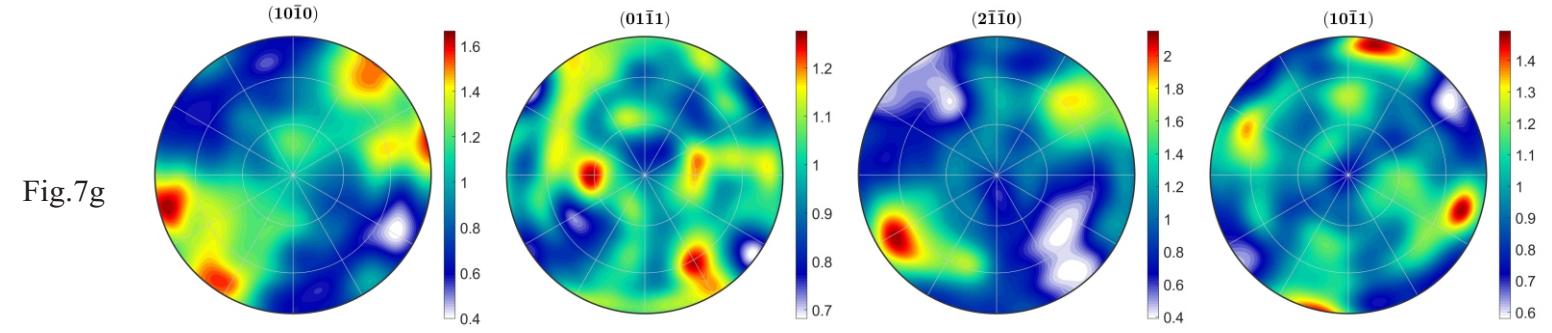
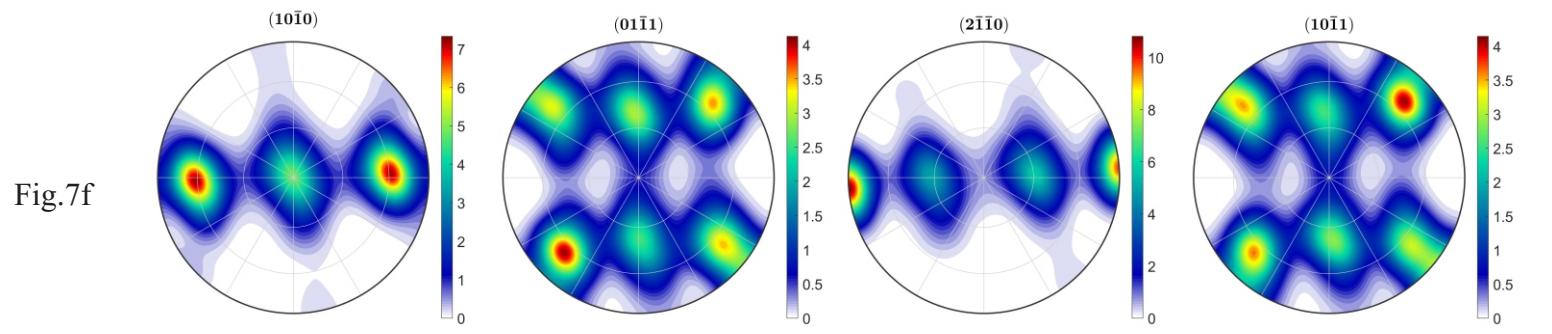
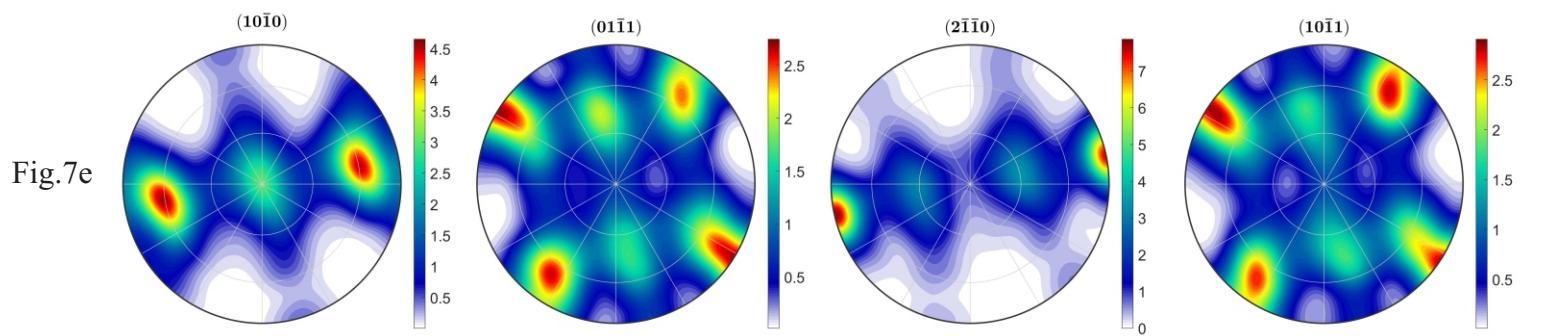


Fig.7j

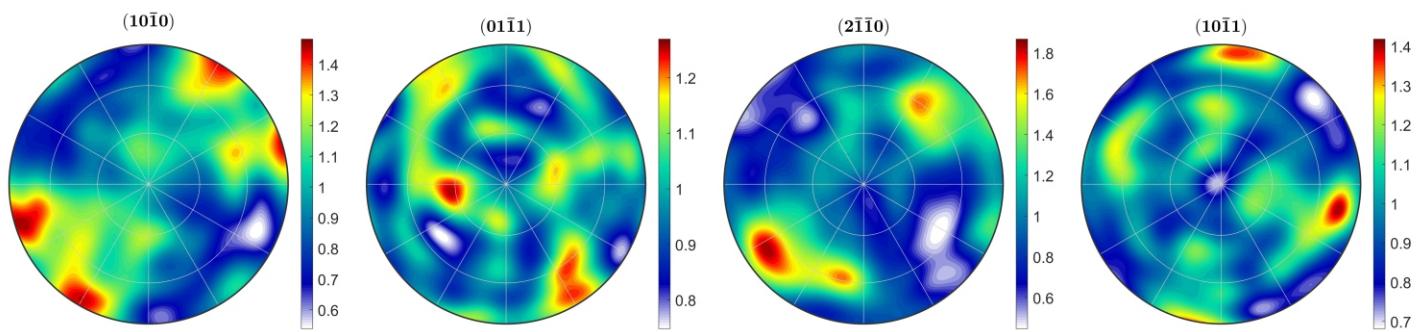


Fig.7k

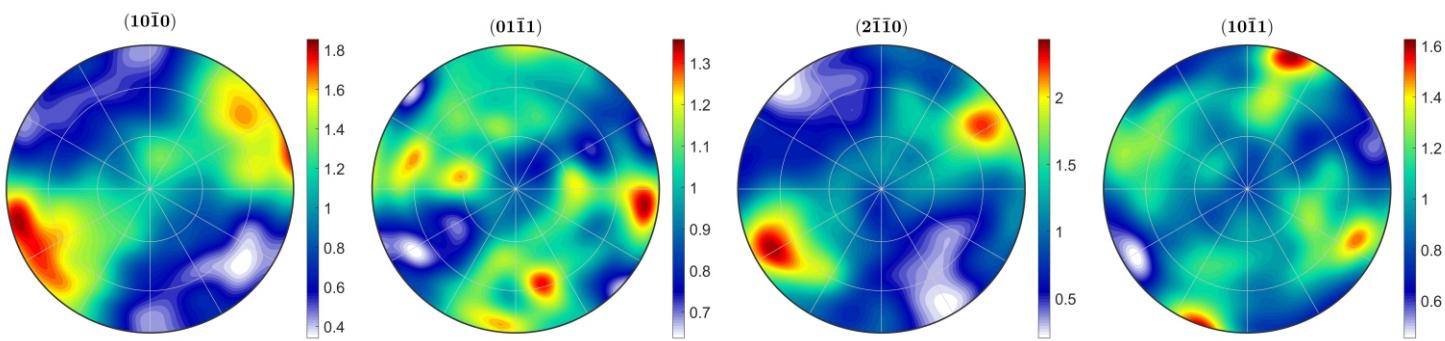


Fig.7l

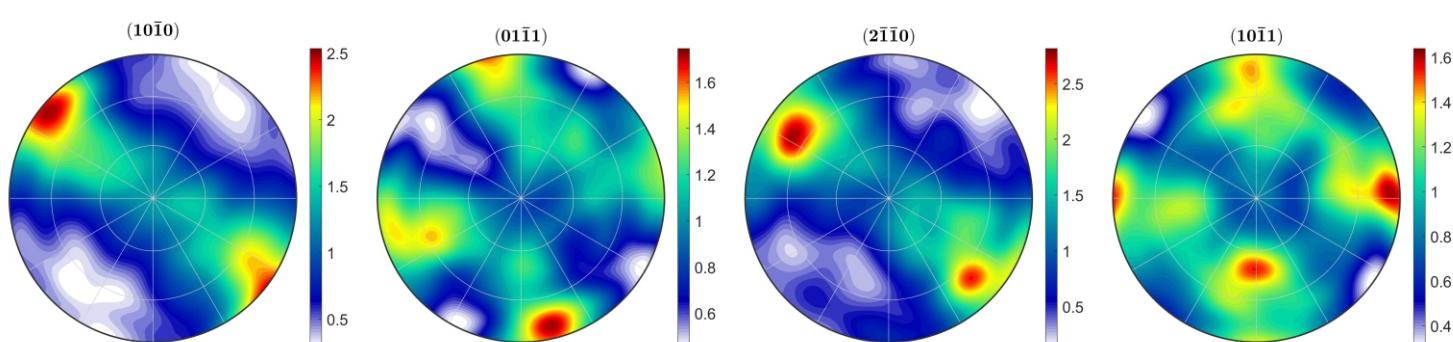


Fig.7m

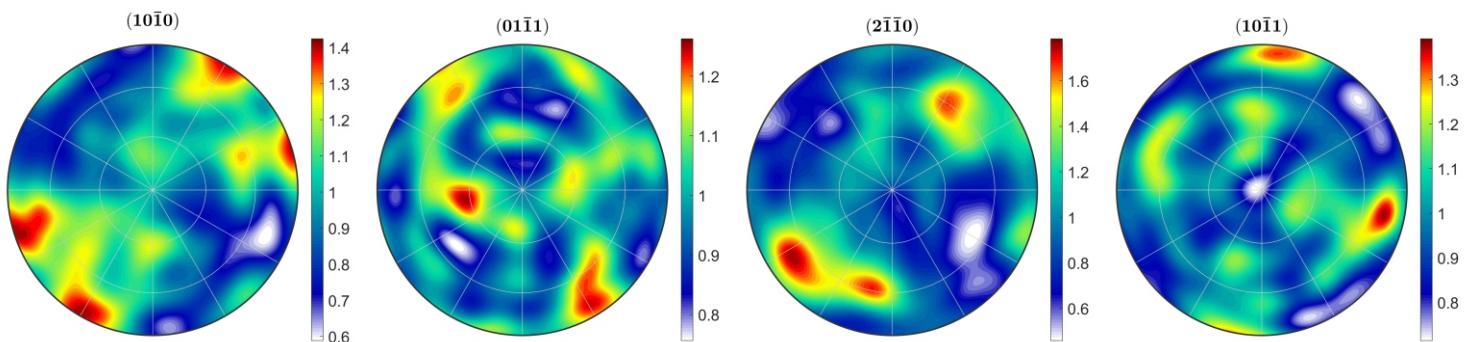
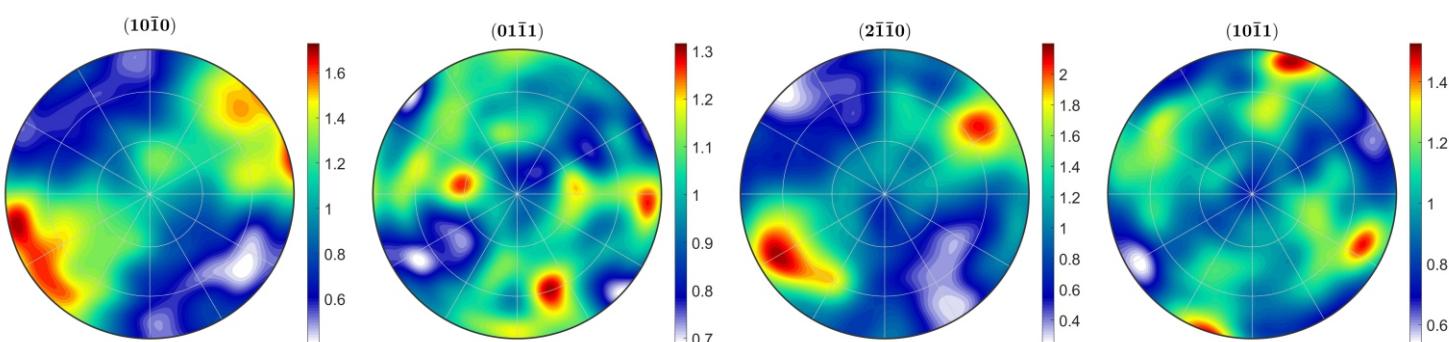
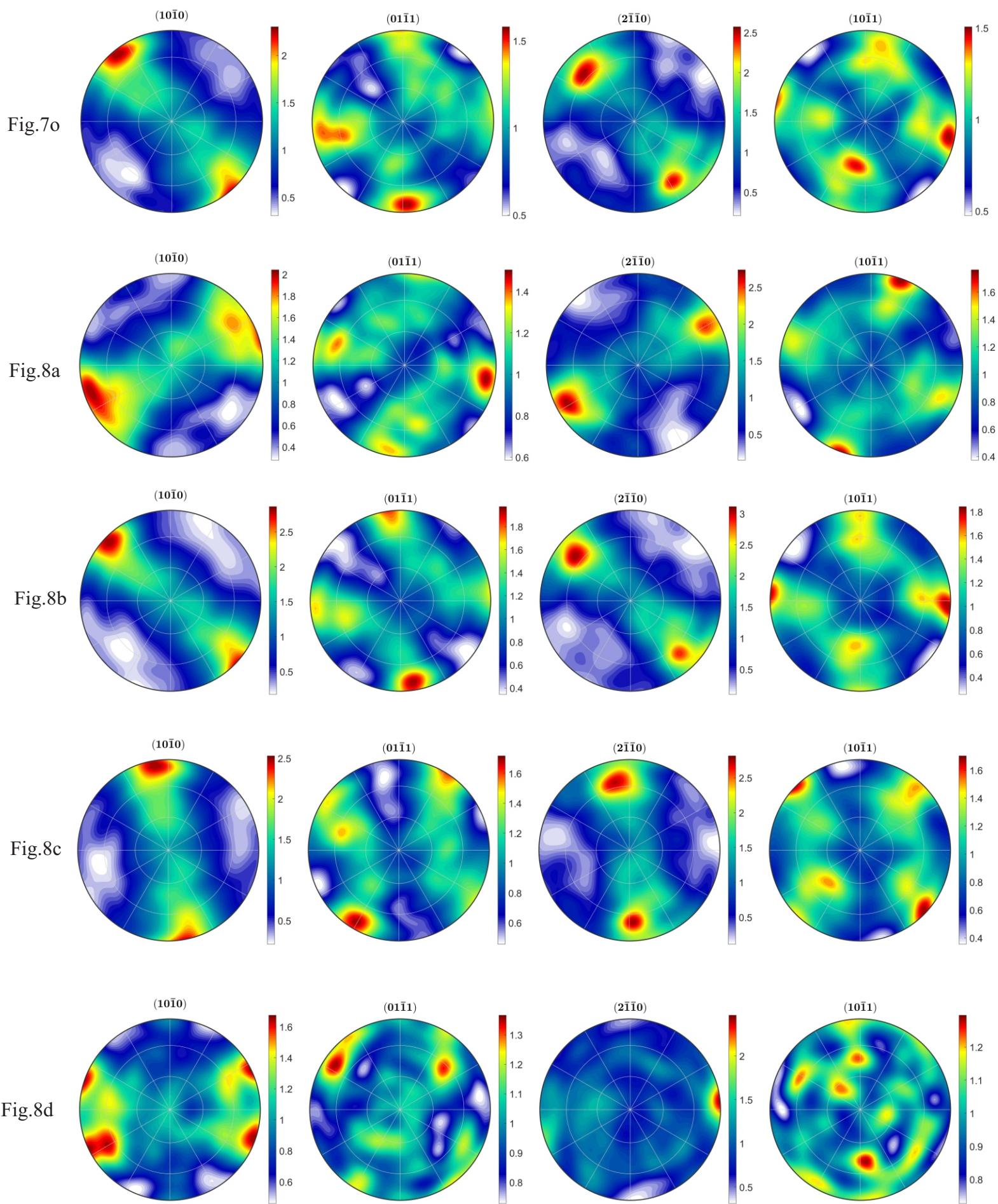
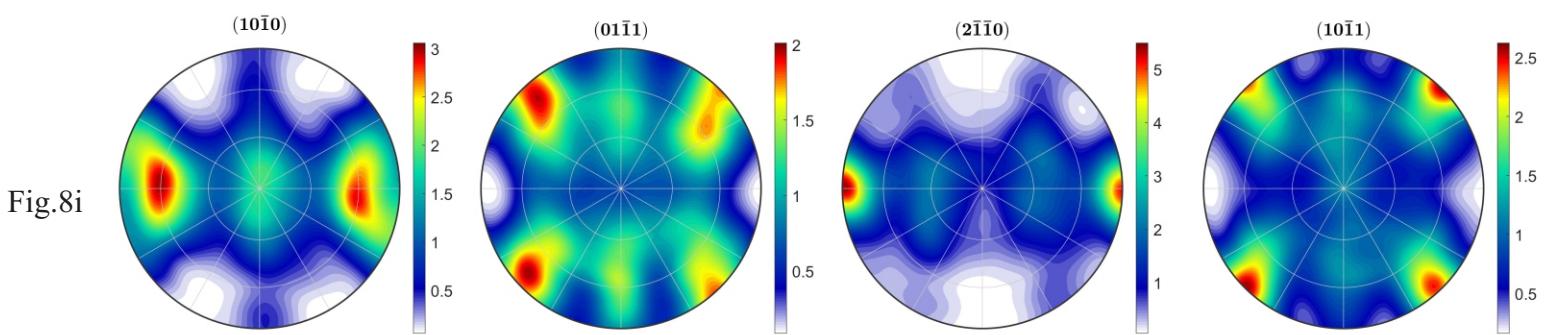
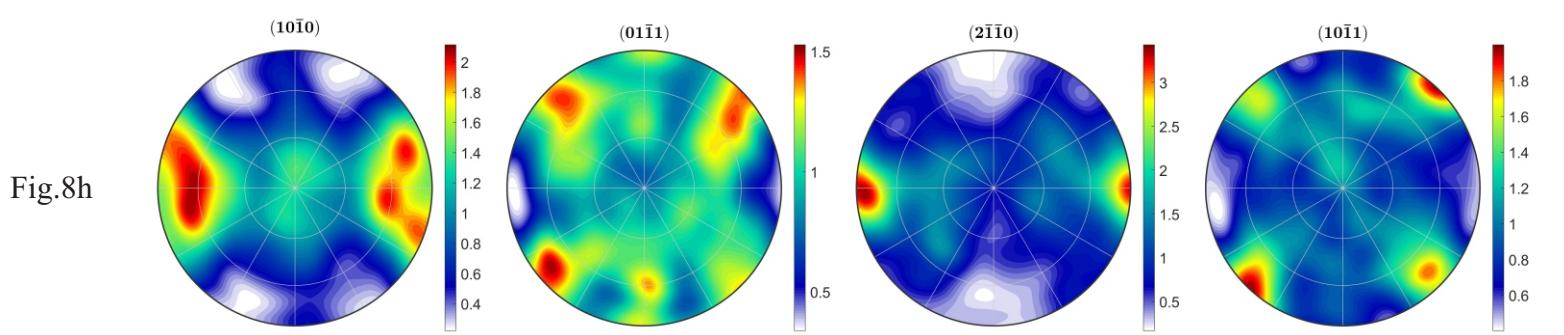
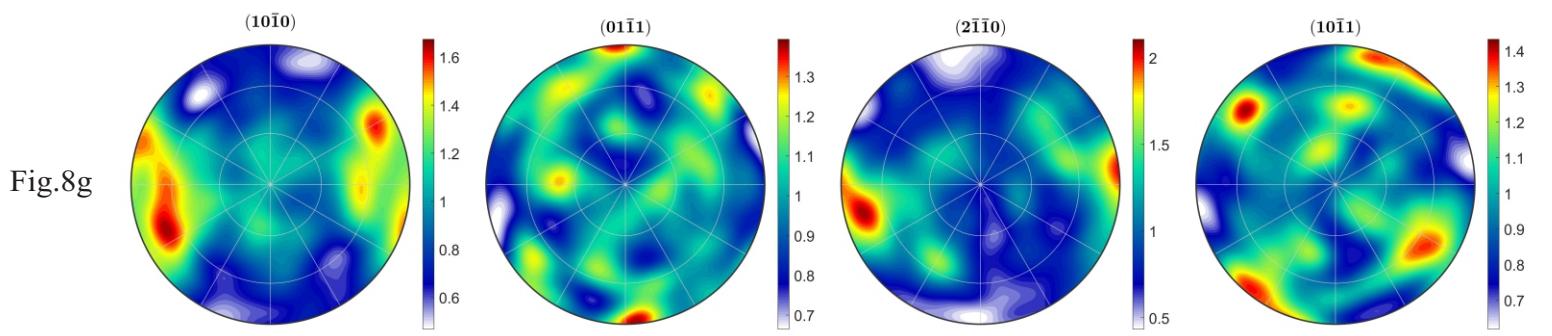
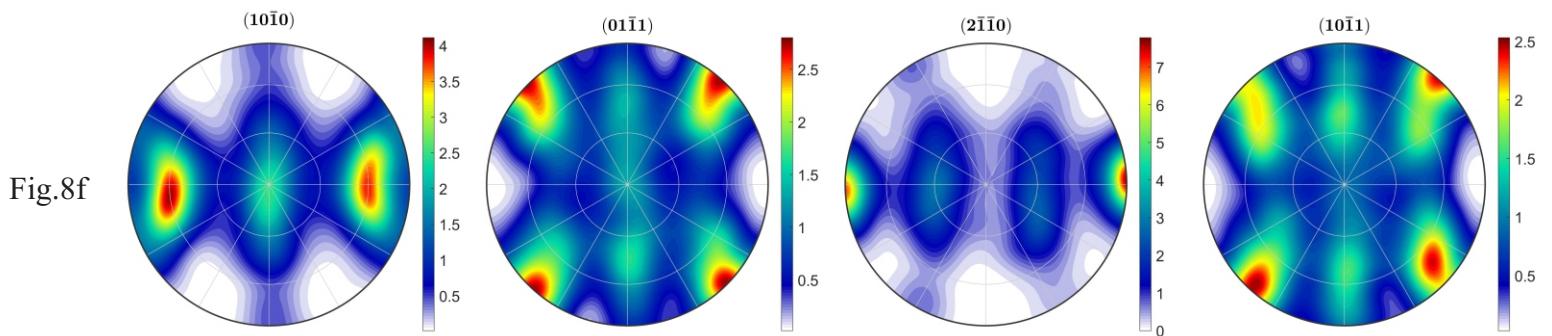
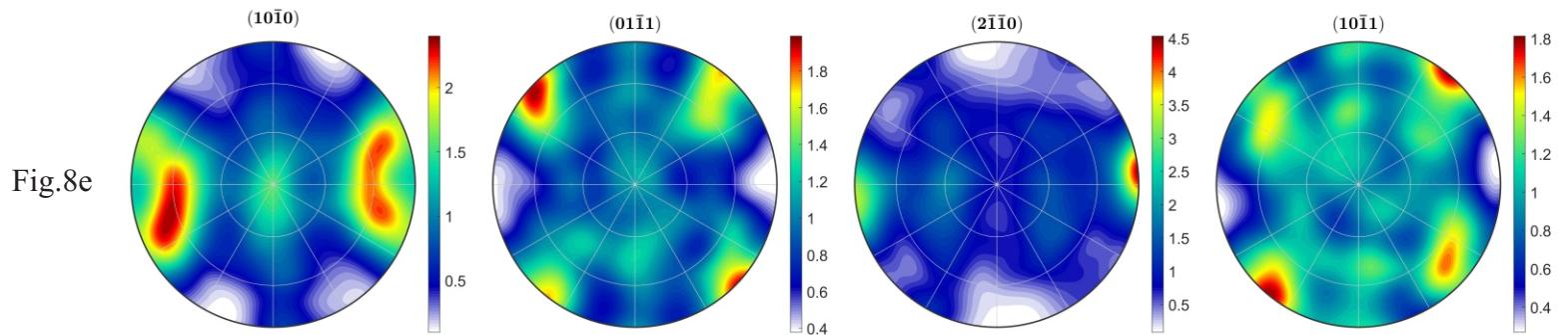
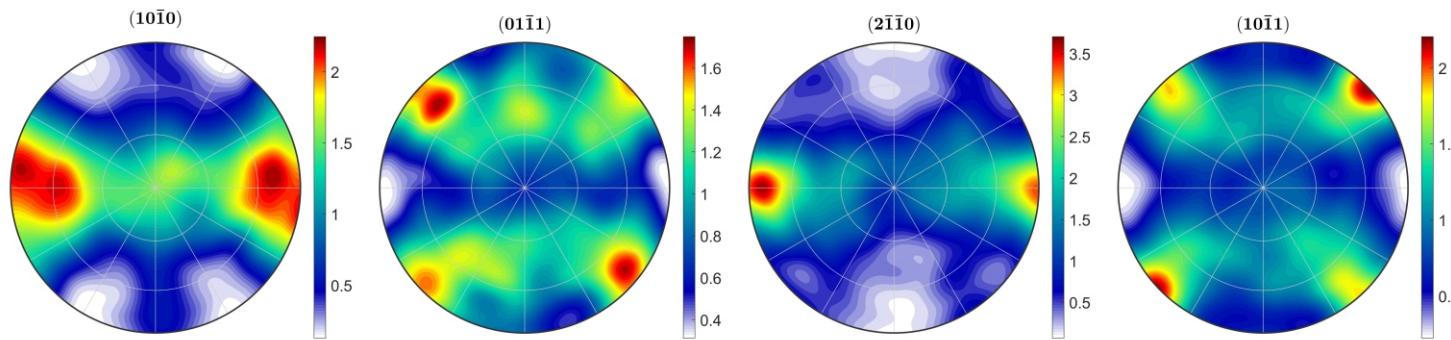
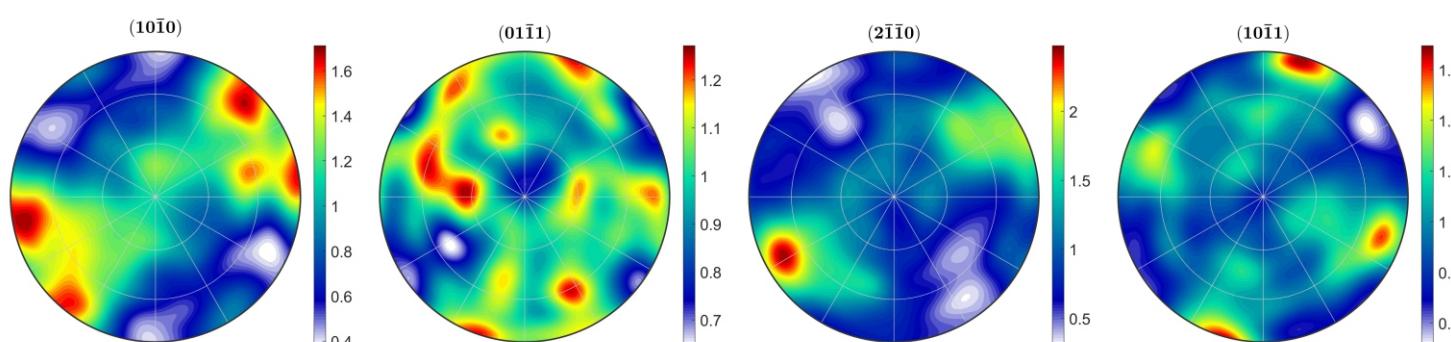
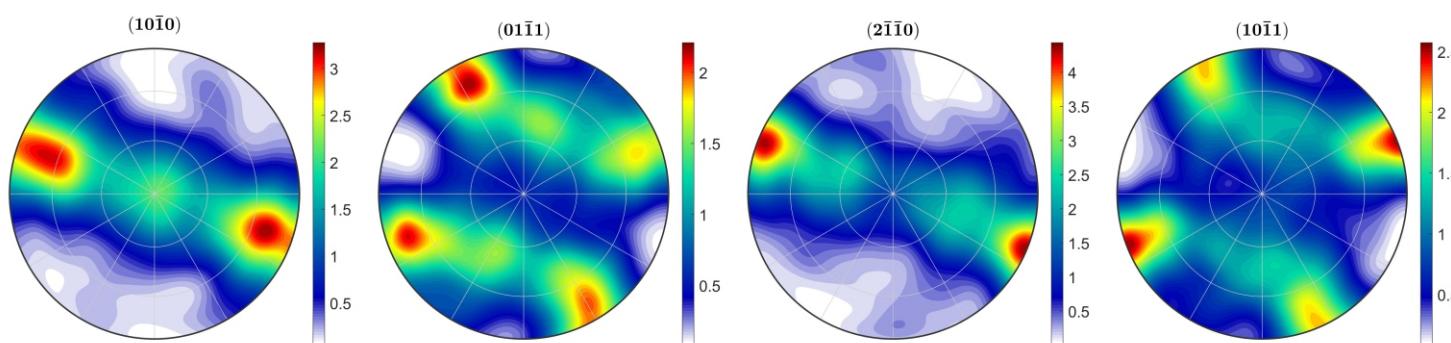
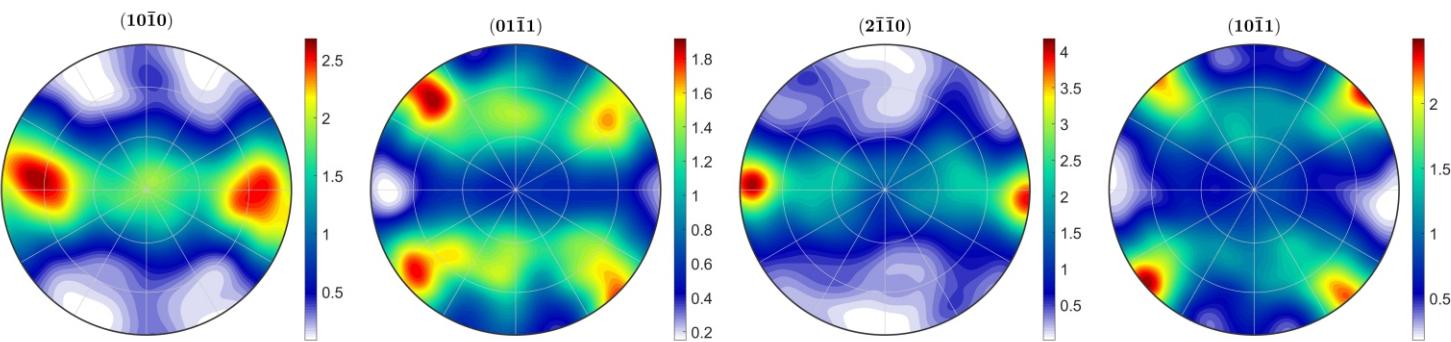
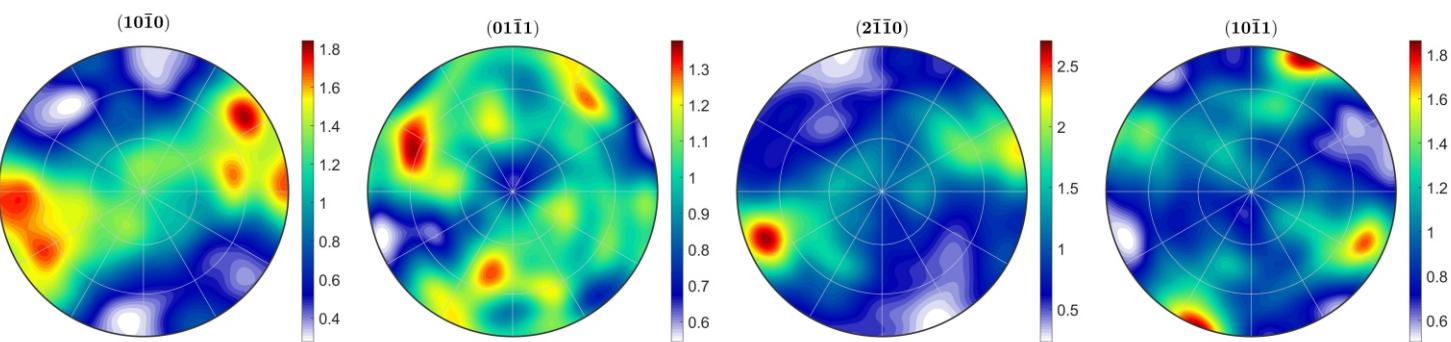


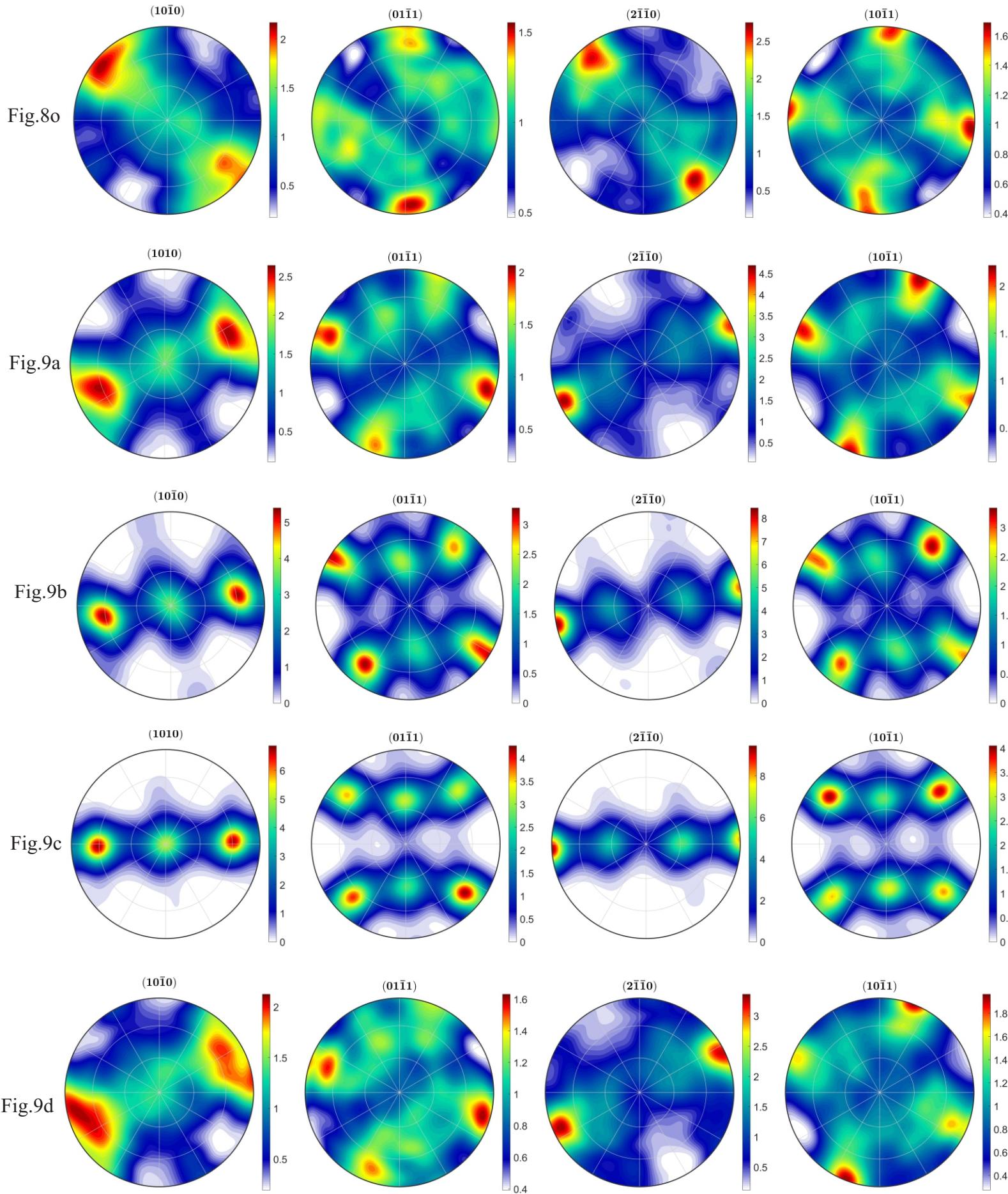
Fig.7n











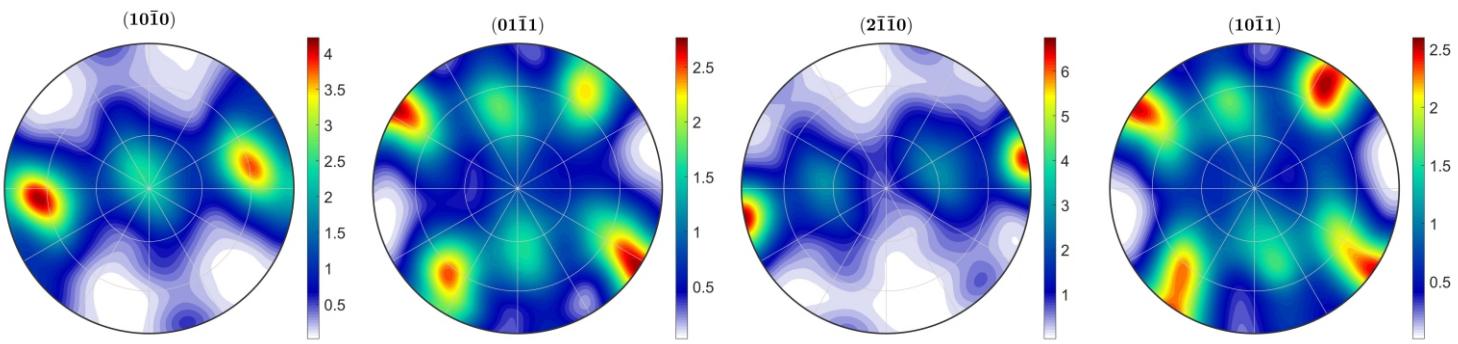


Fig.9e

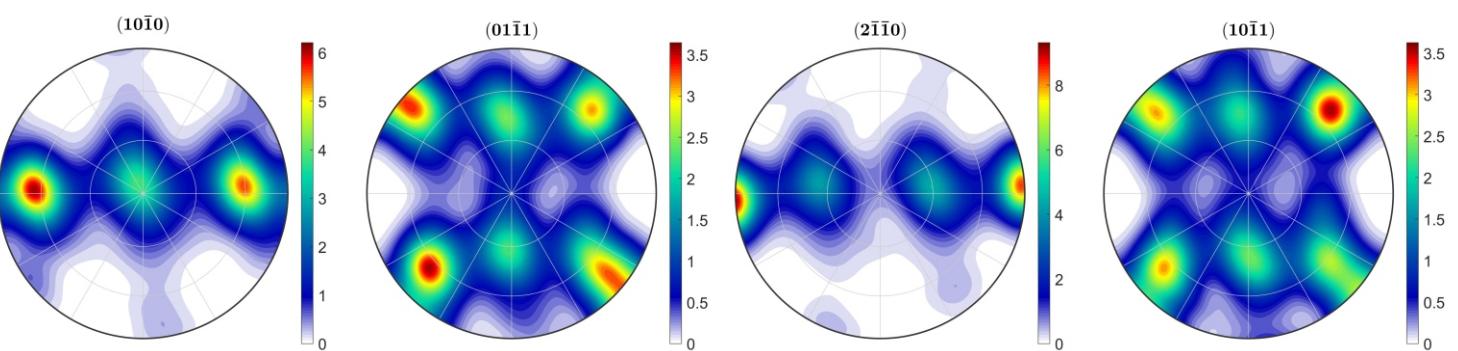


Fig.9f

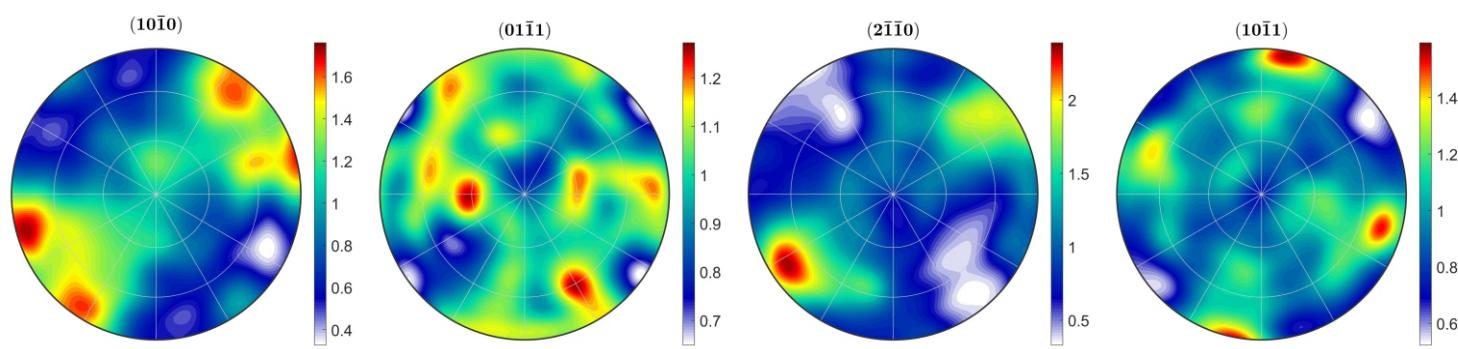


Fig.9g

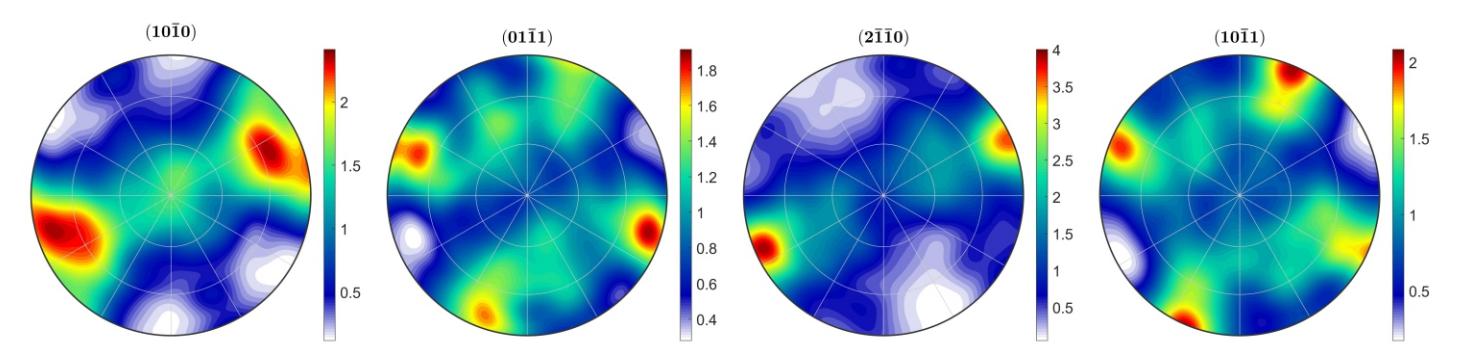


Fig.9h

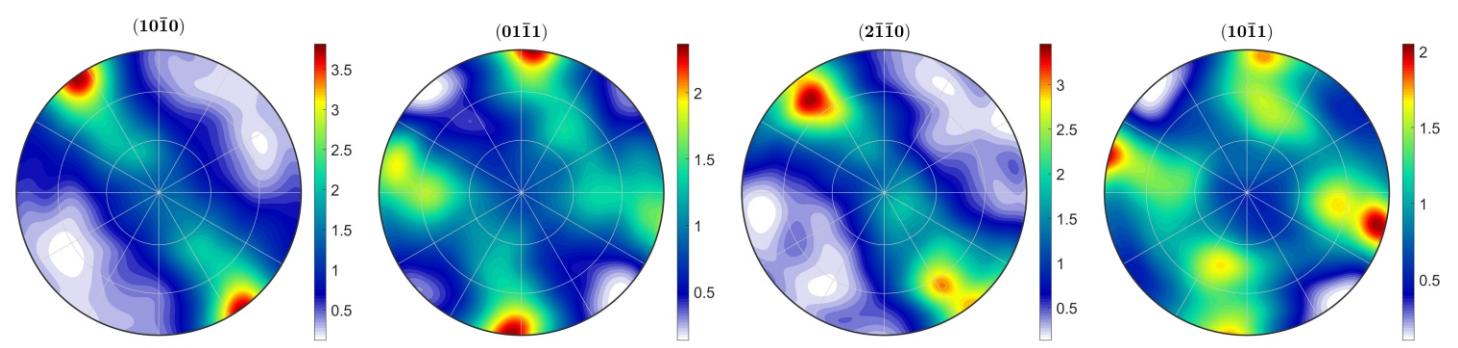
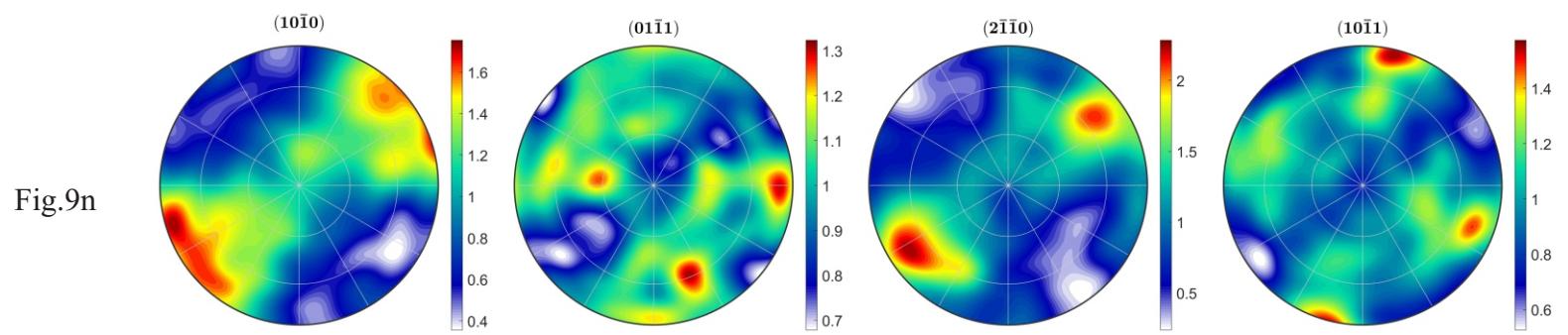
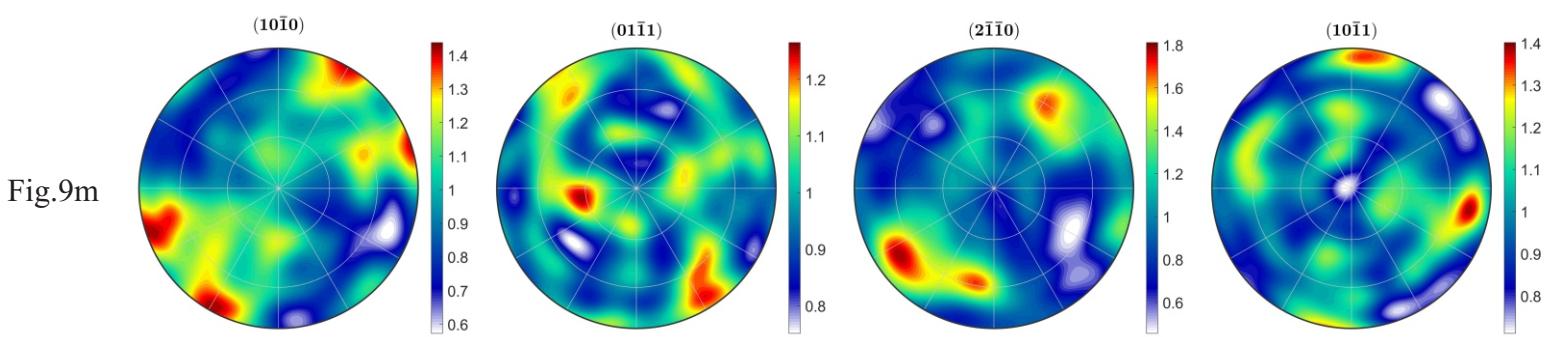
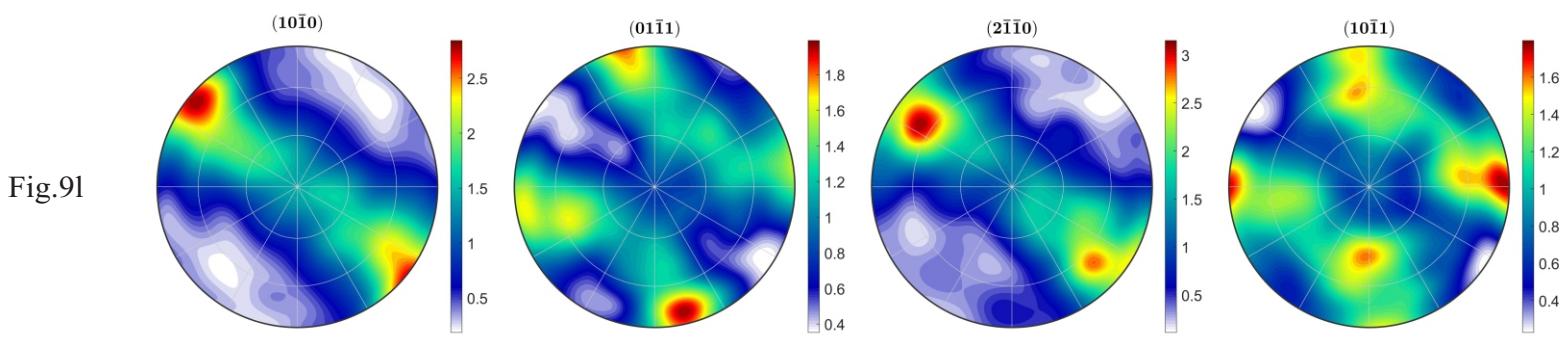
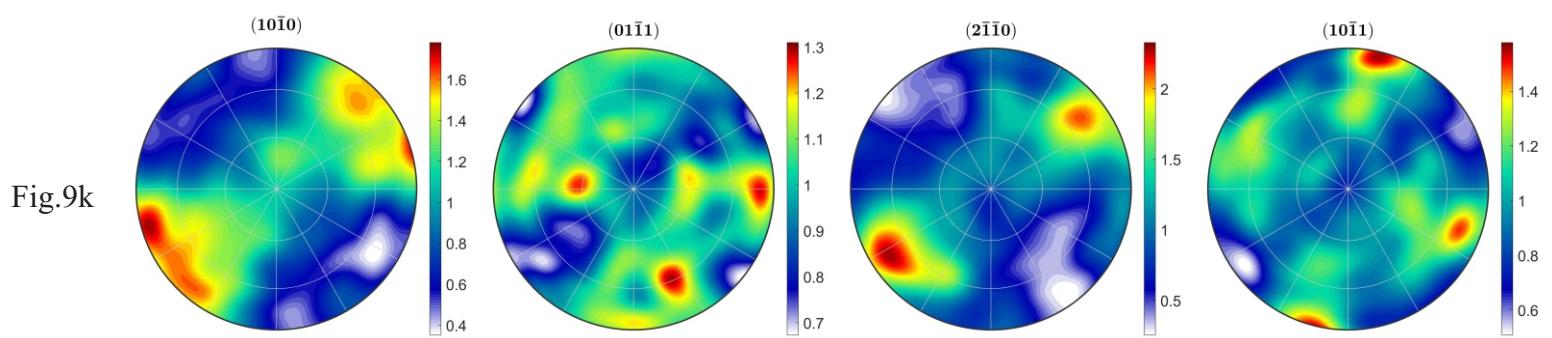
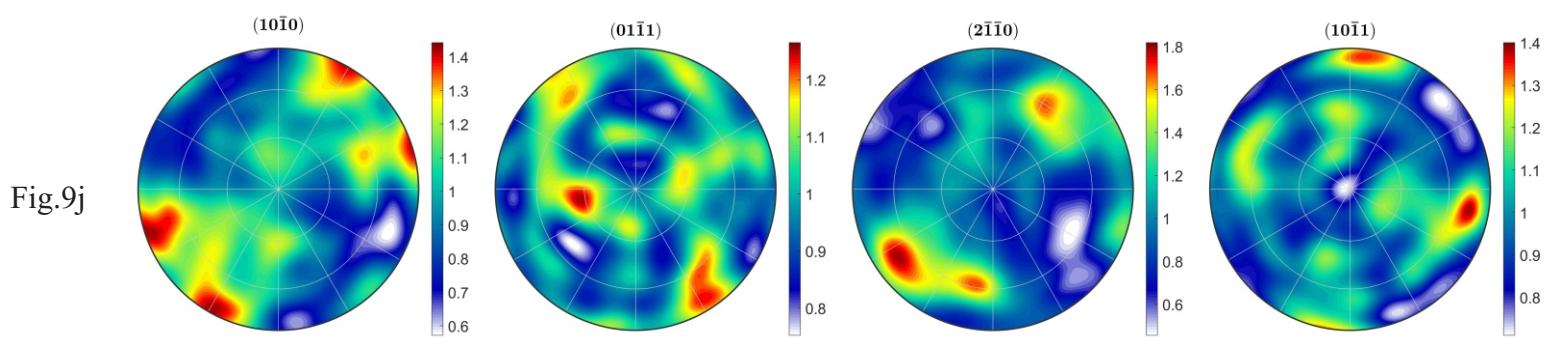
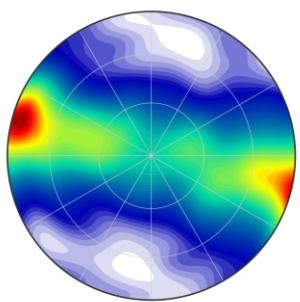


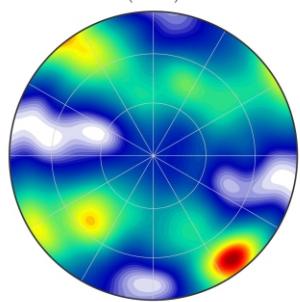
Fig.9i



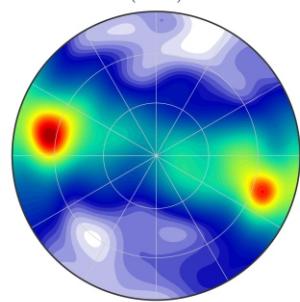
(10 $\bar{1}$ 0)



(01 $\bar{1}$ 1)



(2 $\bar{1}\bar{1}$ 0)



(10 $\bar{1}$ 1)

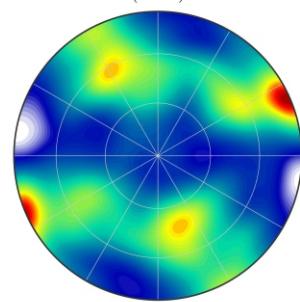


Fig.9o