Many noise or non-physical oscillation. On the other hand, detail heat flux change is lost for too large $M$. In the following, we choose optimum or a little small $M$ value to see heat flux change more clearly.

This analyzing method is applied to the thermocouple (TC) data of Hybrid Directional Langmuir Probe (HDLP) used in Large Helical Device (LHD)\(^2\). Plasma heat flux analysis for LHD discharges of the 14th campaign is done successfully. Figure 2 shows the change in heat flux with/without plasma detachment. Although only total heat load reduction can be seen from TC signal, deduced heat flux shows different time evolution. NBI heating pulse lasts 3 [s] (that is $t = 3.3 \sim 6.3$[s]). For Shot number 99252, plasma stays attachment condition and heat flux keeps about half of the peak value till $t = 6$[s]. For Shot number 99252, plasma detachment occurs at $t = 4.3$[s]. Heat flux at divertor leg starts decreasing at this timing and reaches zero level before NBI pulse end.

Fig. 1: Effect of smoothing parameter $M$. Left figure is for $M = 10$. Right figure is for $M = 15$.

Fig. 2: Heat flux in the detachment experiment. (attach: #99252, detach: #99253)