

**Plasma Diagnostics in the Formation Stage of
LCDC
"The Local Cold and Dense Compress"
from Injected Pellets**

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The pellet injection technique so far successfully dominates over the other fuelling scheme to catch up the requirement of attaining the 'stationary' bulk plasma electron densities around the Greenwald value with retaining a high energy confinement [1]. In the initial stage the injected pellets suffers intense energy flow from the bulk plasma and subsequently the evaporated high density gas start shielding the solid pellet. Through this process the multiple striated plasmoids are formed. Within few tens of micro seconds after the pellet injection, the magnetically confined bulk plasma suffers the multi-layer rapping up with the "LCDC: THE LOCAL COLD AND DENSE COMPRESS" in the helical area around the rational surfaces. In the transient stage we should remember that this technique inherently forms extra-natural plasmoids which contains the SOLID hydrogen pellet as a hardcore. This of course has a few orders of magnitude higher local density and a few orders of magnitude lower temperature than the plasmoids, which again possess the plasma characteristics with few orders of magnitude different from the bulk plasma. In this presentation we would like to discuss the diagnostics techniques to know the formation and expansion process of "the Local Cold and Dense Compress: LCDC". So far quite a few theoretical as well as experimental works are proposed. However those are mainly concentrated on the diagnostics of initial ionization stages with strong neutral hydrogen radiation. In other word not so many work is attained in local high electron density / local low plasma temperature zone. We are much interested in the few eV to few tens of eV local plasma zone with more than 10^{22} electrons/m² and in the duration of mili-second time scale. At the same time, our presentation is addressed to try to explain these still obscure characteristics based on the modified version of the ablation code originally developed by Nakamura et al [2]. In this conference the fundamental scheme of the local plasma diagnostics will be introduced.

References

[1] R.Sakamoto et al, Nuclear Fusion 41,381(2001)

[2] Y.Nakamura, H.Nishighara and M.Wakatani, Nuclear Fusion 26,907(1986)