Contribution ID: **241** Type: **Oral**

# Effect of the second X-point on the hot VDE for HL-2M

*Friday 21 October 2016 15:40 (20 minutes)*

The medium-sized copper-conductor tokamak HL-2M, is currently under construction and to be put into operation in the near future. The (up-down) symmetric poloidal field coil system inside the toroidal field coils of the machine has the capability of generating high vertically-elongated plasma. Thus the VDE is an unavoidable issue for HL-2M. Meanwhile, the opposite PF current in the middle of three divertor coils can generate two X-points, around which a poloidal weak field is existent. In this paper, effect of the second X-point on the hot VDE is investigated by the mature non-linear time-dependent DINA code. During the investigation, variations of the distance between the two X-points are divided into two groups. (I) exact snowflake-snowflake plus-standard divertor and (II) exact snowflake-snowflake minus. Simulation result shows that, for group (I), as the distance increases, the poloidal weak field becomes long and thin in the vertical direction, causing the increase of the average VDE velocity before the thermal quench. Meanwhile, during the current quench, the halo current and the EM force on the vacuum vessel almost have the same decline trend along with the increase of the distance. Further for group (II), the left minus and right minus cases are considered, respectively. The long and thin poloidal weak field, in the horizontal direction, seems to be beneficial for restraining the development of VDE. During the current quench, the halo current peak, as well as the maximum vertical EM force in VV becomes larger with increasing the distance of the second X-point. Through the comparison of the left minus and the right minus cases, it is found that the halo current peak in the left minus case becomes higher, meanwhile the maximum vertical EM force in VV increases slower. In the view of the EM loads, the stand divertor is better than the snowflake plus, which is better than the exact snowflake. The snowflake minus is the worst scenario.

## Paper Number

TH/7-2

## Country or International Organization

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**Session Classification:** Disruptions

**Track Classification:** THS - Magnetic Confinement Theory and Modelling: Stability