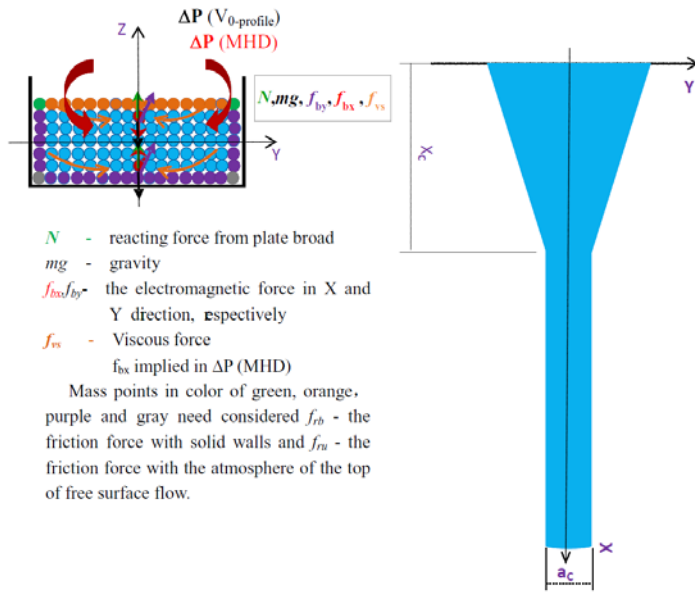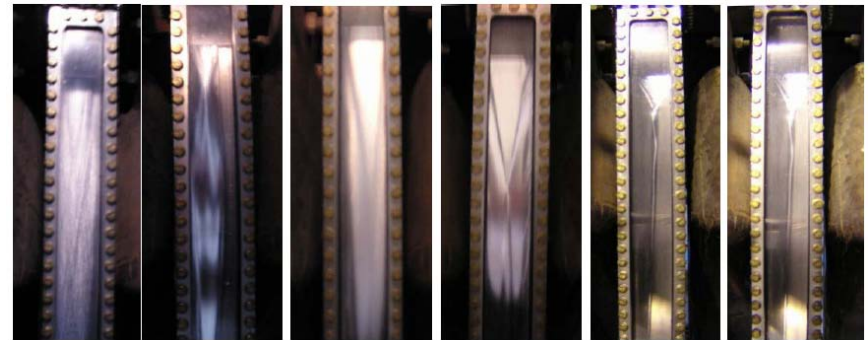# Full-coverage Free Surface Flow for Liquid Metal PFCs - FNS/1-3

- How to get a Full-coverage Free Surface Flow is remained a key issue for Liquid Metal (LM) PFCs
- Using FISB model design guiding the secondary flow to get the full-coverage free surface flow and verified by experiments
- Next should focus on LM splash during ELMs and LM interaction with plasma and heat transfer and so on for the full-coverage free surface flow.
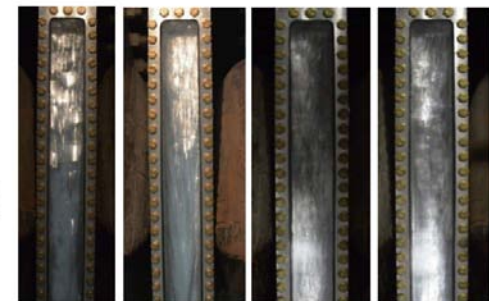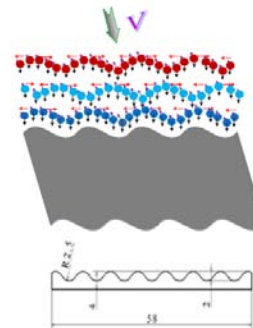

N — reacting force from plate broad
mg — gravity
f_{bx}, f_{by} — the electromagnetic force in X and Y direction, respectively
f_{vs} — Viscous force
f_{bx} implied in ΔP (MHD)
Mass points in color of green, orange, purple and gray need considered f_{rb} - the friction force with solid walls and f_{ru} - the friction force with the atmosphere of the top of free surface flow.

A flowing incompressible small balls (FISB) model basic **on experimental Results of liquid metal (LM) free surface on the flat plate** for LM PFCs

LM free surface on the flat plate

$a_0 = 5mm$	5mm	3 mm	2.3mm	1mm	1mm
$V_0 = 1.34 ms^{-1}$	$134 ms^{-1}$	$4.36 ms^{-1}$	$1.94 ms^{-1}$	$0.40 ms^{-1}$	$0.40 ms^{-1}$
$B_0 = 0$	1.825 T	1.825 T	1.825 T	$B_0 = 0$	1.825 T

LM free surface on the wavy plate

$a_0 = 5mm$		$a_0 = 1mm$	
$B_0 = 0$	1.825T	$B_0 = 0$	1.825 T
$V_0 = 0.63 ms^{-1}$	$0.83 ms^{-1}$	$V_0 = 2.95 ms^{-1}$	$2.67 ms^{-1}$