

MHD CALCULATIONS FOR Sn-CLIFF

Presented by S.Smolentsev

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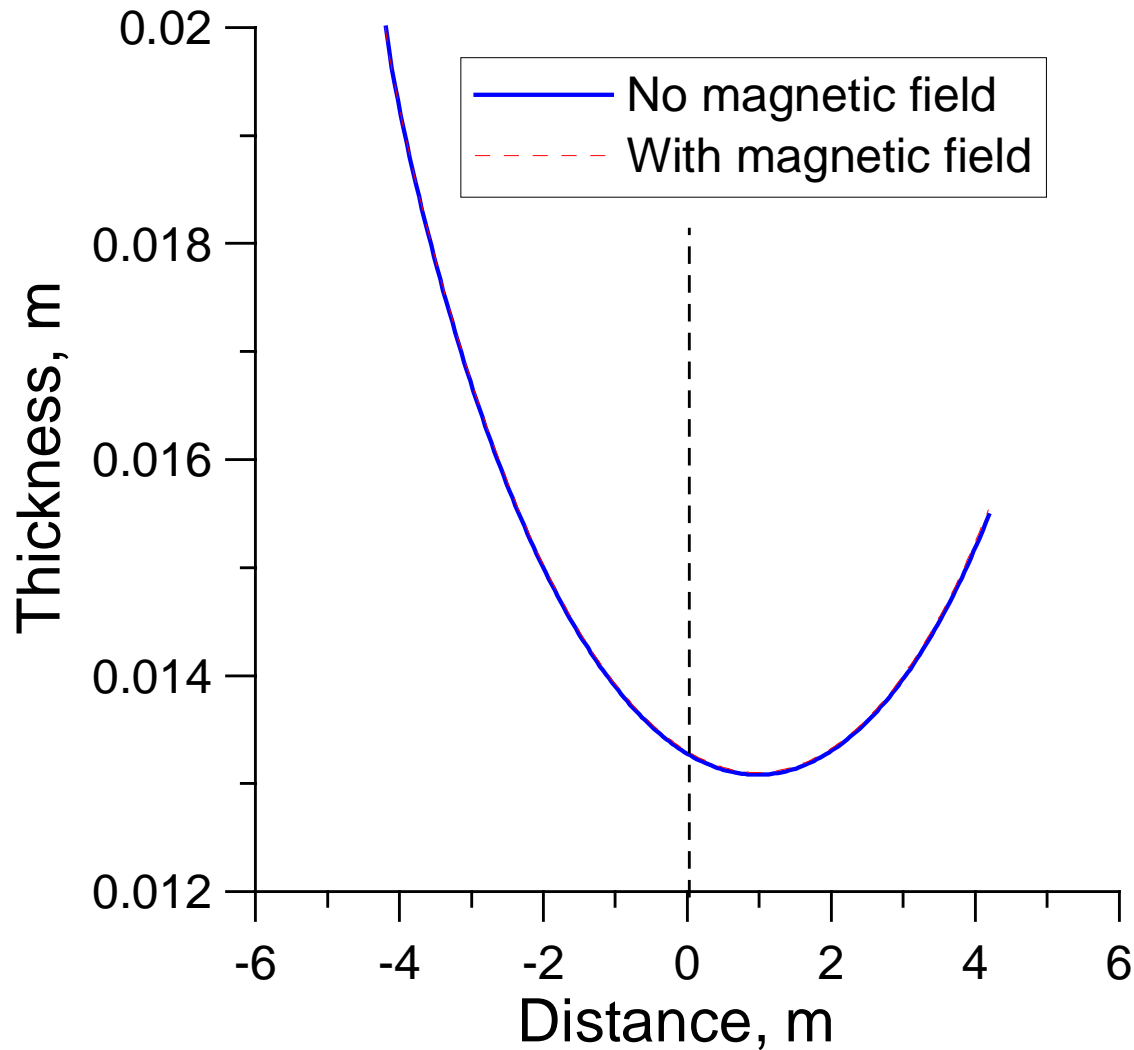
FLOW:

- OB First Wall, ARIES RS
- Sn
- Axial symmetry **NB**
- 8-m section
- Inlet flow thickness = 2 cm
- Inlet velocity = 10 m/s

MHD EFFECTS:

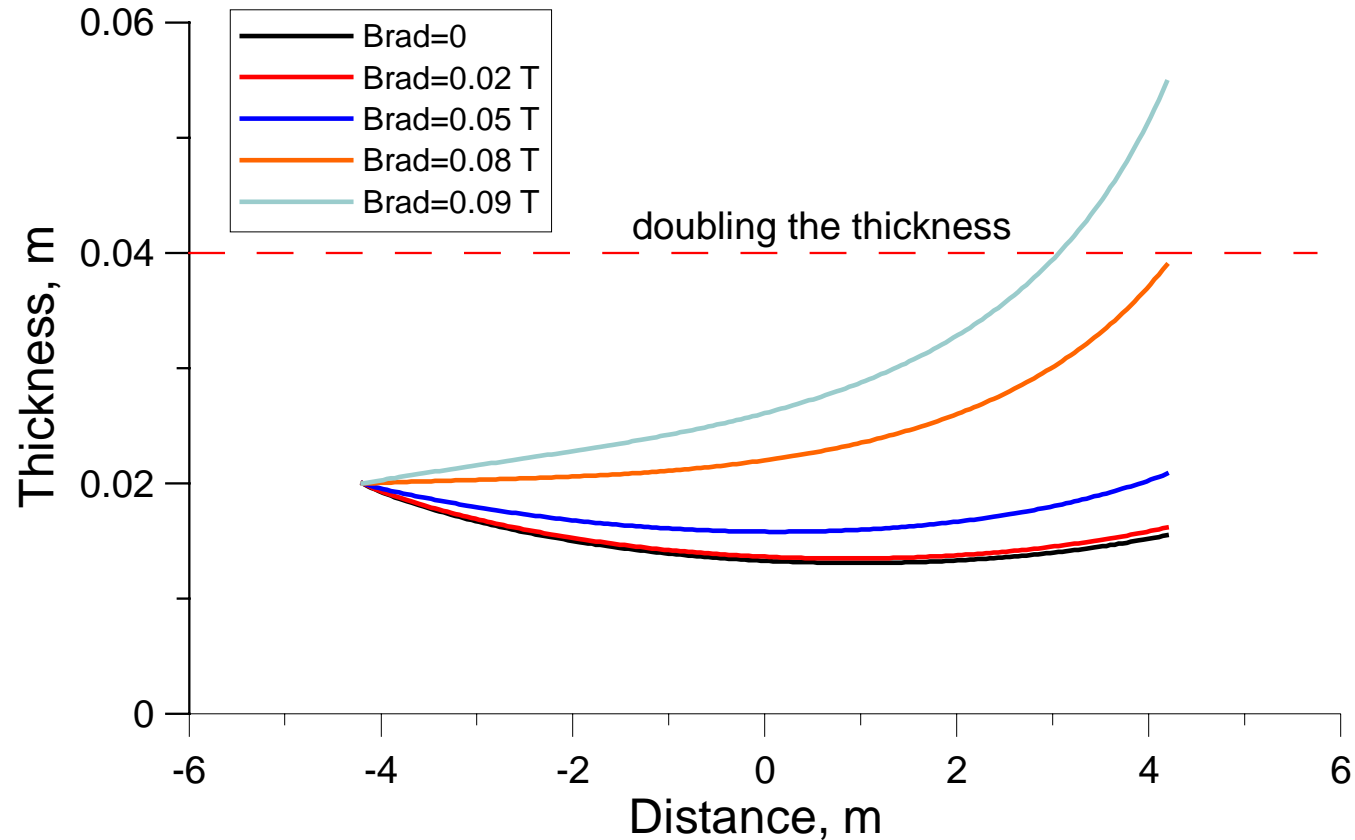
- Flow thickening caused by toroidal "1/r" magnetic field, B_{tor}
- Flow thickening caused by radial magnetic field, B_{rad}
- Poloidal flow caused by B_{tor} and B_{rad}

EFFECT OF THE TOROIDAL "1/r" MAGNETIC FIELD ON THE FLOW THICKNESS ($B_{\text{tor}} \sim 1/r$, $B_{\text{rad}}=0$, $B_{\text{pol}}=0$)



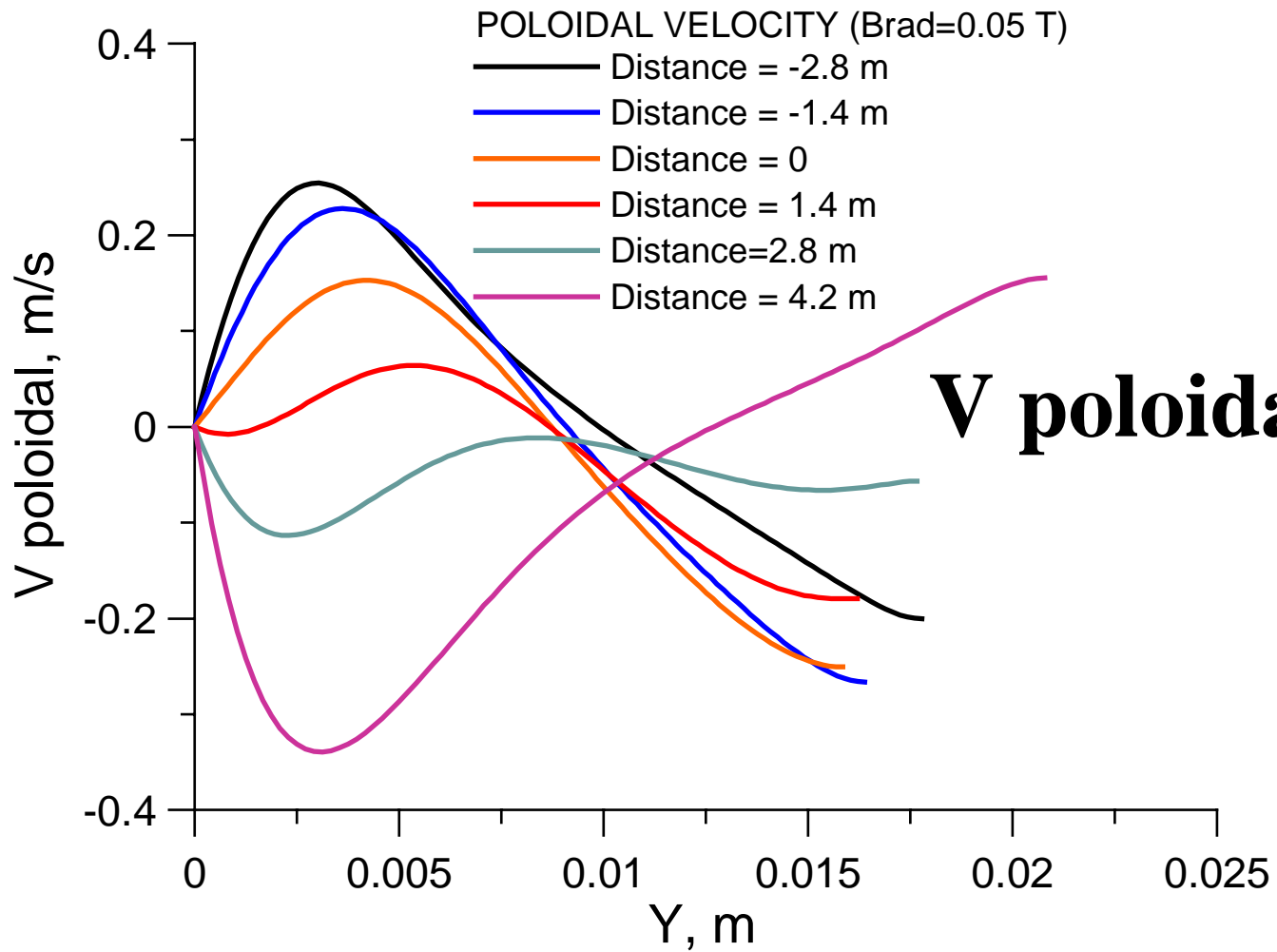
Effect < 1%

EFFECT OF THE RADIAL MAGNETIC FIELD ON THE FLOW THICKNESS ($B_{\text{tor}}=0$, $B_{\text{rad}}=\text{Const}$, $B_{\text{pol}}=0$)



Brad > 0.08 T will result in more than 2 times flow thickening

POLOIDAL FLOW CAUSED BY "Btor+Brad" ($B_{\text{tor}} \sim 1/r$, $B_{\text{rad}} = \text{Const}$, $B_{\text{pol}} = 0$)



SUMMARY

EFFECT	Sn-CLiFF	Li-CLiFF
Flow thickening due to "1/r" B_{tor}	<1%	<10%
Flow thickening due to B_{rad}	$Brad > 0.08$ T results in more than 2 times flow thickening	$Brad > 0.015$ T results in more than 2 times flow thickening
Poloidal flow caused by "$B_{tor} + B_{rad}$"	$V_{max} = 0.4$ m/s at $Brad = 0.05$ T	$V_{max} = 2$ m/s at $Brad = 0.01$ T

CONCLUSION

Roughly speaking, MHD effects in Sn-CLiFF are 5 times smaller than those in Li-CLiFF