12. X now compact <u>with boundary</u>.

$$x^{\infty}\Psi_c^{-\infty}(X) = C^{\infty}(X^2)$$ Generically smoothing operators

$\Psi_c^{\mathbb{Z}}(X)$ "cusp" algebra (or $\Psi_b^{\mathbb{Z}}(X)$)

cusp

boundary

Has $\underline{\underline{2}}$ non-trivial pieces:

$$x^{\infty}\Psi_c^{-\infty}(X) \xhookrightarrow{\text{ideal}} \Psi_c^{\mathbb{Z}}(X) \xrightarrow{J} \begin{matrix} \sigma \\ \oplus \\ I \end{matrix} \begin{matrix} A^{\mathbb{Z}}(X) \leftarrow \text{interior behaviour} \\ \\ I^{\mathbb{Z}}(X) \leftarrow \text{boundary behaviour} \end{matrix}$$

$$A^{\mathbb{Z}}(X) = C^{\infty}(S_c^*X)[[\rho]]$$ "As before"

$$I^{\mathbb{Z}}(X) = \Psi^{\mathbb{Z}}_{sm}(\partial X)[[x]]$$

$x=0$ defines boundary.

- Range of J is a subalgebra

$$\sigma(P) \equiv \sigma(I(P))$$ Taylor series in X