TOPICS IN GEOMETRIC MEASURE THEORY

Week 2

- Review Proposition 12.20 (Approximation of the characteristic function of a set of locally finite perimeter by smooth functions)in Maggi (Chapter 12)
- Read Theorem 13.1 (Co-area formula for Lipschitz functions) in Maggi (Chapter 13)
- **Problem:** Let $\{E_k\}_k$ and E be sets of locally finite perimeter in $\mathbb{R}^n$. Assume that

$$\mu_{E_k} \rightharpoonup \mu_E$$

and that there exists a sequence $\{r_i\}_i$ such that $r_i \to \infty$ as $i \to \infty$, and $\forall i \in \mathbb{N}$

$$\lim_{k\to\infty} P(E_k; B_{r_i}) = P(E; B_{r_i}).$$

Show that

$$|\mu_{E_k}| \rightharpoonup |\mu_E|.$$

- Read Theorem 13.8 (Approximation of sets of locally finite perimeter by smooth sets) Maggi (Chapter 13). How is this different from Theorem 13.1? What are the main issues to overcome in this theorem? *Can this approximation be done by interior sets?*
- Read the introduction to Chapter 15 in Maggi.
- Read section 15.1 in Maggi.