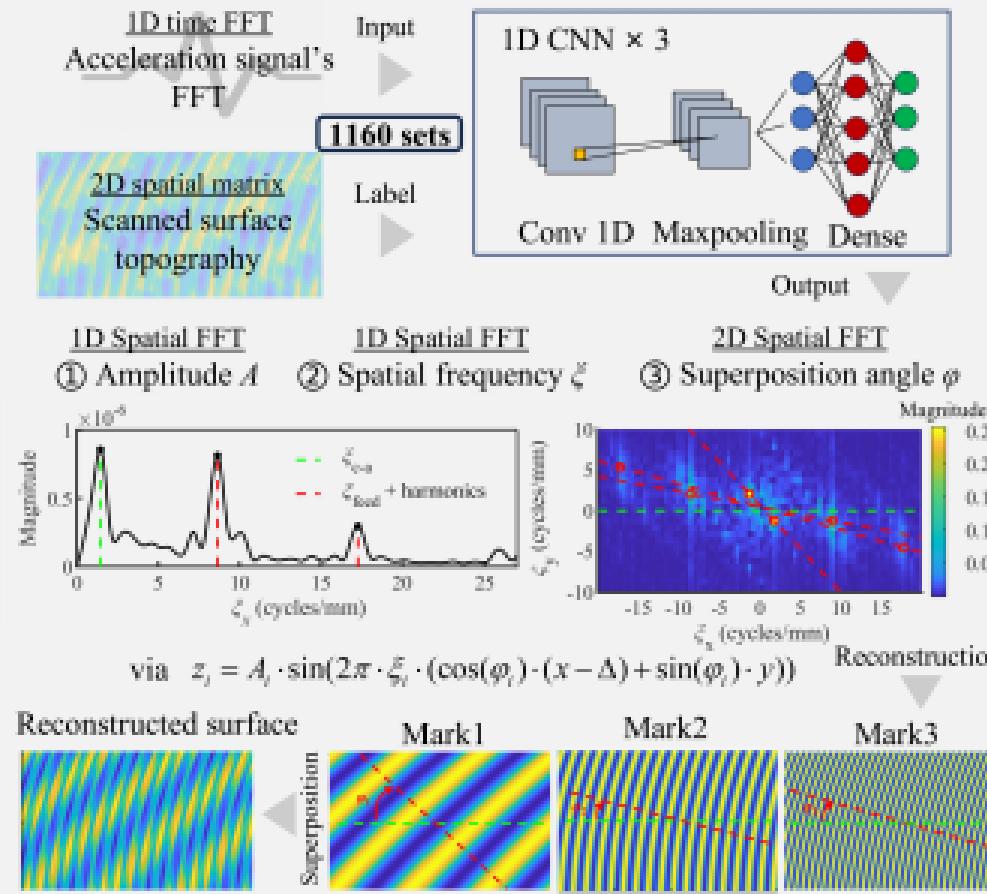


Acceleration signal → Surface reconstruction



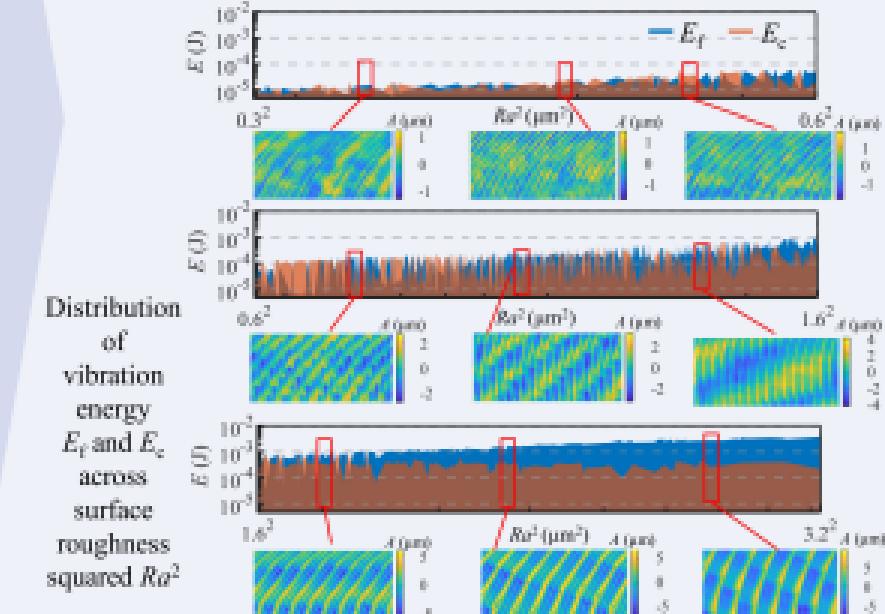
Vibration energy based indicator

Cutting tool as spring-mass system, elastic energy: $E = 1/2Kx^2$
Surface height z reflects tool tip displacement x :

$$E = \frac{1}{N} \times \frac{1}{2} K \sum_{i=1}^N \sum_{j=1}^{N_i} z_{ij}^2$$

Marks are classified as forced vibration or chatter, with energy computed as

- Total vibration energy E , $r = 0.98$, highly correlated with R_a^2
- Forced vibration energy E_f , $r = 0.95$
- Chatter energy E_c , $r = 0.33$



Reconstruction quality

