

$$\mathbb{P}\left(\frac{\lambda_N}{2\sqrt{N}} \geq e^{N^{-2/3}\epsilon}\right) \leq Ce^{-c'\epsilon^{3/2}}$$

$$\left(\frac{\lambda_N}{2\sqrt{N}} - 1\right)N^{2/3}$$

$$\mathbb{P}\left(\left(\frac{\lambda_N}{2\sqrt{N}} - 1\right)N^{2/3} \geq \delta\right)$$

$$= \mathbb{P}\left(\left(\frac{\lambda_N}{2\sqrt{N}}\right) \geq 1 + N^{-2/3}\delta\right)$$

$$\leq \mathbb{P}\left(\frac{\lambda_N}{2\sqrt{N}} \geq e^\delta\right)$$

$$e^{-x} \geq 1 - x \geq e^{-x - x^2} \quad |x| \leq 1$$

C