## motivations for the $\Gamma_{qq}/\Gamma_{had}$ measurement

The partial decay widths are "comfortables" as the experimental errors are reduced by the ratio and the dependence on SM uncertainties is suppressed.

The decay widths can be expressed as:

$$\Gamma(Z \to qq) = 12\Gamma_o(g_{Aq}^2 R_{Aq} + g_{Vq}^2 R_{Vq})$$

where:

- $\Gamma_o = \frac{G_\mu M_Z^3}{24\sqrt{2}\pi} = 82.944 MeV$
- $R_{Aq}, R_{Vq}$ "radiators"

  $R_{Aq} \approx R_{Vq} \approx 1 + \frac{\alpha_s(M_Z)}{\pi}$
- $g_{Aq}, g_{Vq}$ include the e.w. corrections

  $\Rightarrow (\frac{m_t}{M_Z})^2$ and $ln(\frac{m_H}{M_Z}$