$$\mathcal{F}_{g,n}^{(II)} = \int_{\mathcal{M}_{g,n}} \left\langle \prod_{k=1}^{3g-3+n} |\mu_k \cdot G^-|^2 \prod_{k=1}^{n} \int \psi(z_k) \prod_{\ell=1}^{n} \hat{\psi} \right\rangle_{\text{top}}$$