

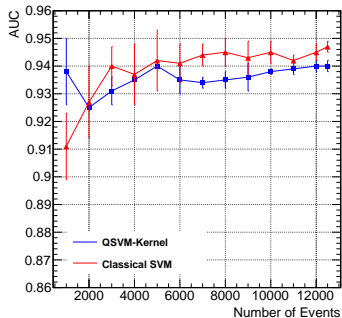
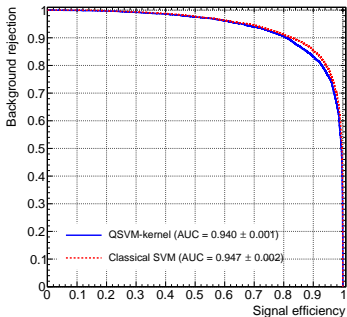
Cross check of QSVM

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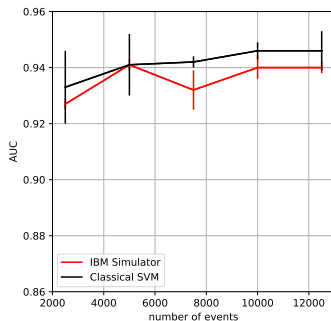
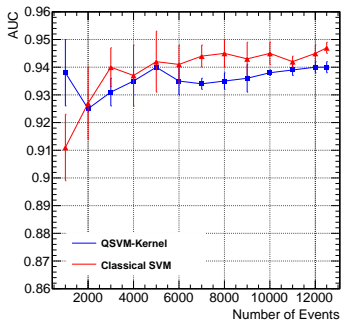
Plots from paper draft



My Xcheck : data preparation

- Discriminating variables
 - $\Delta R_{\gamma,j}^{min}, \Delta \Phi_{\gamma\gamma}, \Delta P_{\gamma\gamma,jj}, p_{\gamma\gamma}, E_{\gamma\gamma}, M_{jj}^{reco}$
- Normalize the variables to $[-1,1]$
- Classical SVM : $C=18, \gamma = 0.1$
- Quantum Simulator : $C=45$

Paper draft vs my results



nEvents	2500	5000	7500	10000	12500
AUC(QSVM)	0.927±0.002	0.941±0.002	0.932±0.007	0.940±0.004	0.940±0.001
AUC(SVM)	0.933±0.013	0.941±0.011	0.941±0.002	0.946±0.003	0.946±0.007

See discussion with Qiyu in next page

- We first check the random number. It is not due to random number
- I use "CV=5", the old code. Qiyu suggests to use "CV=3".
- My numbers are on test sample. Qiyu's numbers are on training sample.
- We have same AUC numbers and errors for SVM when we use same seed, same cv and same test sample.
 - 12500 signal events in training, $C=14$, $\gamma=0.1$, seed=1, cv=3
 - $AUC=0.944\pm 0.009$, 0.009 is $2 \times \textit{standard derivation}$