comparison

January 22, 2019

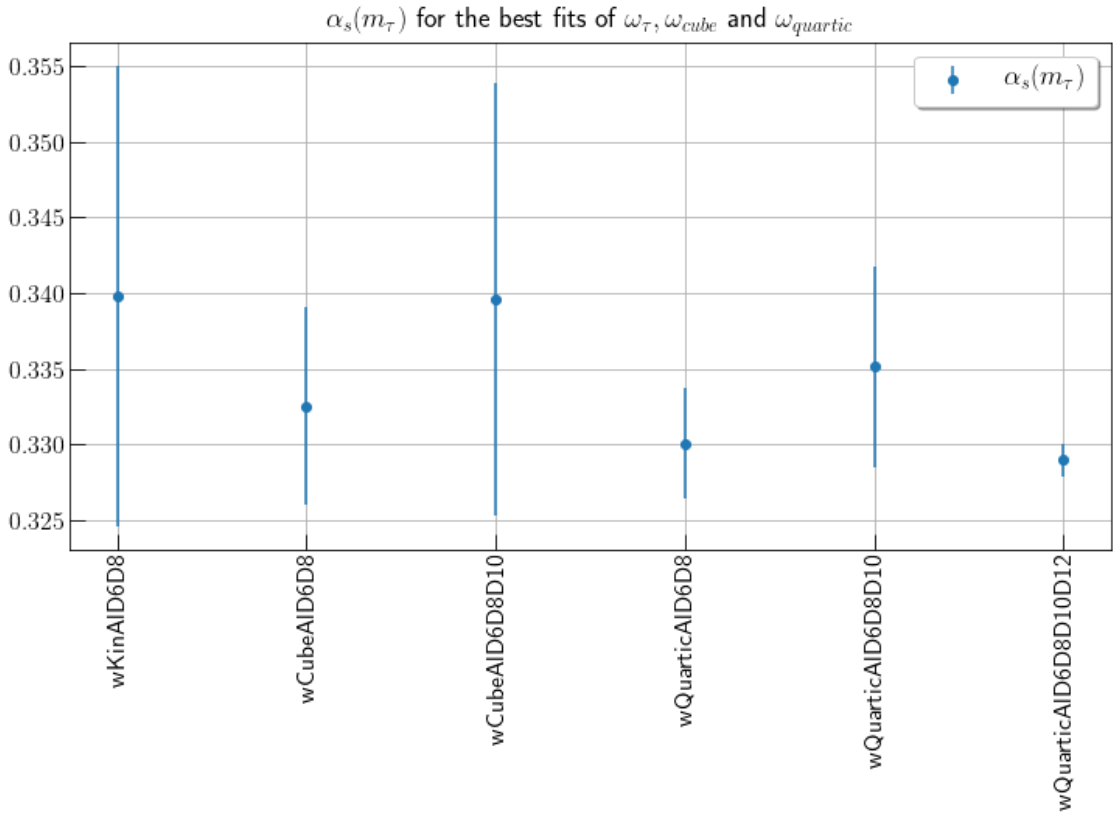
In [5]:
```
exec(open('initNotebook.py').read())
```

In [6]:
```
# Import and cobine best rows
importAll()
alFits = ['wKinAlD6D8', 'wCubeAlD6D8', 'wCubeAlD6D8D10', 'wQuarticAlD6D8', 'wQuarticAl
opeFits = ['wKinAlD6D8', 'wCubeAlD6D8', 'wCubeAlD6D8D10', 'wQuarticAlD6D8', 'wQuarticA

alDF = pd.DataFrame()
for fit in alFits:
   alDF[fit] = getBestRow(globals()[fit])

opeDF = pd.DataFrame()
for fit in opeFits:
    opeDF[fit] = getBestRow(globals()[fit])
```

In [7]:
```
plt.title(r'$\alpha_s(m_\tau)$ for the best fits of $\omega_\tau, \omega_{cube}$ and $'
plt.errorbar(list(alDF), alDF.loc['alpha'], alDF.loc['alphaErr'], fmt='.', marker='o',
plt.legend()
plt.xticks(rotation='vertical', size=16)
plt.yticks(size=16)
plt.gcf().set_size_inches(12, 6)
plt.gcf().savefig('./plots/comparisonAlpha.png', dpi=300)
plt.show()
```

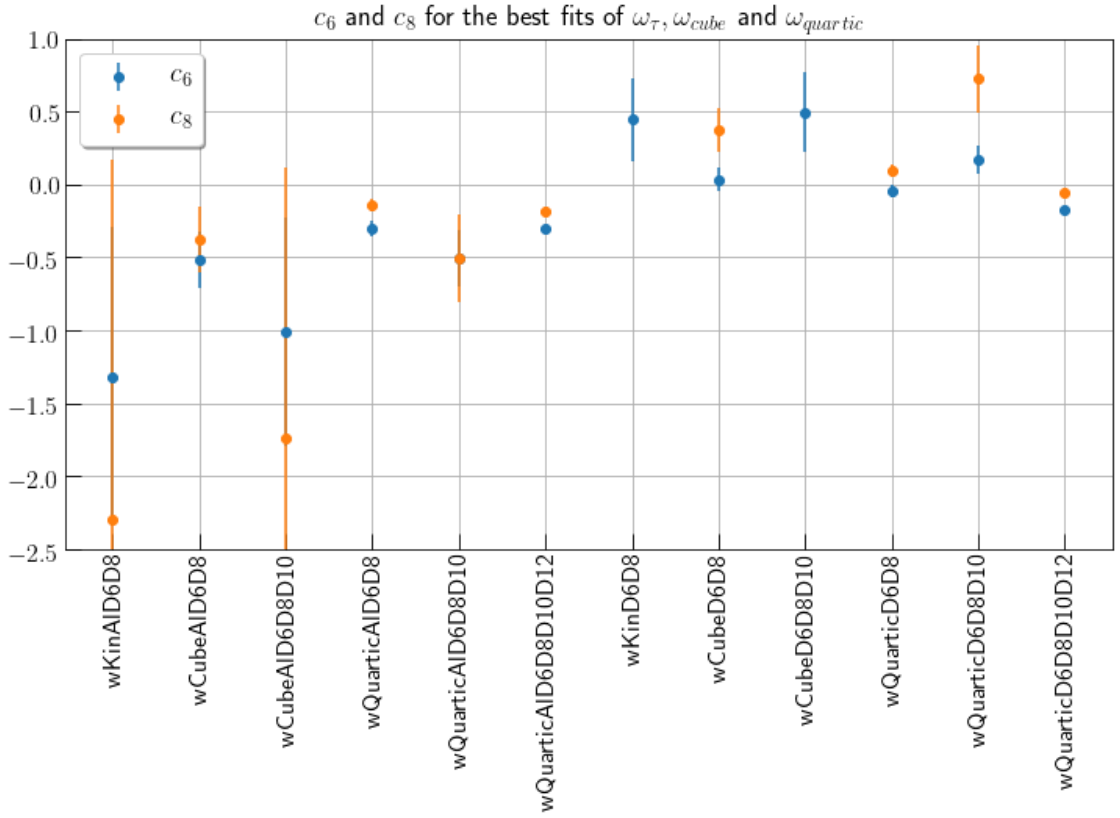



```
In [14]: print('mean: ', alDF.loc['alpha'].mean(), 'var: ', alDF.loc['alpha'].var())

mean:  0.3343513702845637 var:  2.171510636343035e-05
```

In the upper plot we compare the best fits (chosen by χ^2/dof closest to 1). The mean value and variance are given by $\mu_{\alpha_s} = 0.3344$ and $\sigma^2_\alpha = 2.17e-5$. The errors of $\omega_{Quartic}$ for two and four OPE coefficients included are too small. Consequently these two fits should be excluded from the analysis. The rest of the fits are promising.

```
In [19]: plt.title(r'$c_6$ and $c_8$ for the best fits of $\omega_\tau, \omega_{cube}$ and $\om
         plt.errorbar(list(opeDF), opeDF.loc['c6'], opeDF.loc['c6Err'], fmt='.', marker='o', la
         plt.errorbar(list(opeDF), opeDF.loc['c8'], opeDF.loc['c8Err'], fmt='.', marker='o', la
         plt.ylim(-2.5, 1)
         plt.legend()
         plt.yticks(size=16)
         plt.xticks(rotation='vertical', size=16)
         plt.gcf().set_size_inches(12, 6)
         plt.gcf().savefig('./plots/comparisonD6D8.png', dpi=300)
         plt.show()
```




```
In [24]: print('c6 mean: ', opeDF.loc['c6'].mean(), 'and var: ', opeDF.loc['c6'].var())
         print('c8 mean: ', opeDF.loc['c8'].mean(), 'and var: ', opeDF.loc['c8'].var())

c6 mean:  -0.25197500266261713 and var:  0.2914995377744493
c8 mean:  0.07669547490082569 and var:  2.0072640099835493
```

In this plot we compare the c_6 and c_8 OPE coefficients of the best fits by χ^2/dof value. Even if the coefficients show a huge variation of value we present their mean and variance: $\mu_{c_6} = -0.252$ with $\sigma^2_{c_6} = 0.29$ and $\mu_{c_8} = 0.077$ with $\sigma^2_{c_8} = 2.01$. We see that c_6 takes a negative and c_8 a postive value for most of the fits. Furthermore due to the variance of the OPE coefficients it is dificult to choose the right value for them. As there are more problems with including higher dimension contributions of the OPE we do not include them in our comparison.