

# Feynman Diagrams via TikZ

**Flip Tanedo**

*Institute for High Energy Phenomenology,  
Newman Laboratory of Elementary Particle Physics,  
Cornell University, Ithaca, NY 14853, USA*

*E-mail:* pt267@cornell.edu

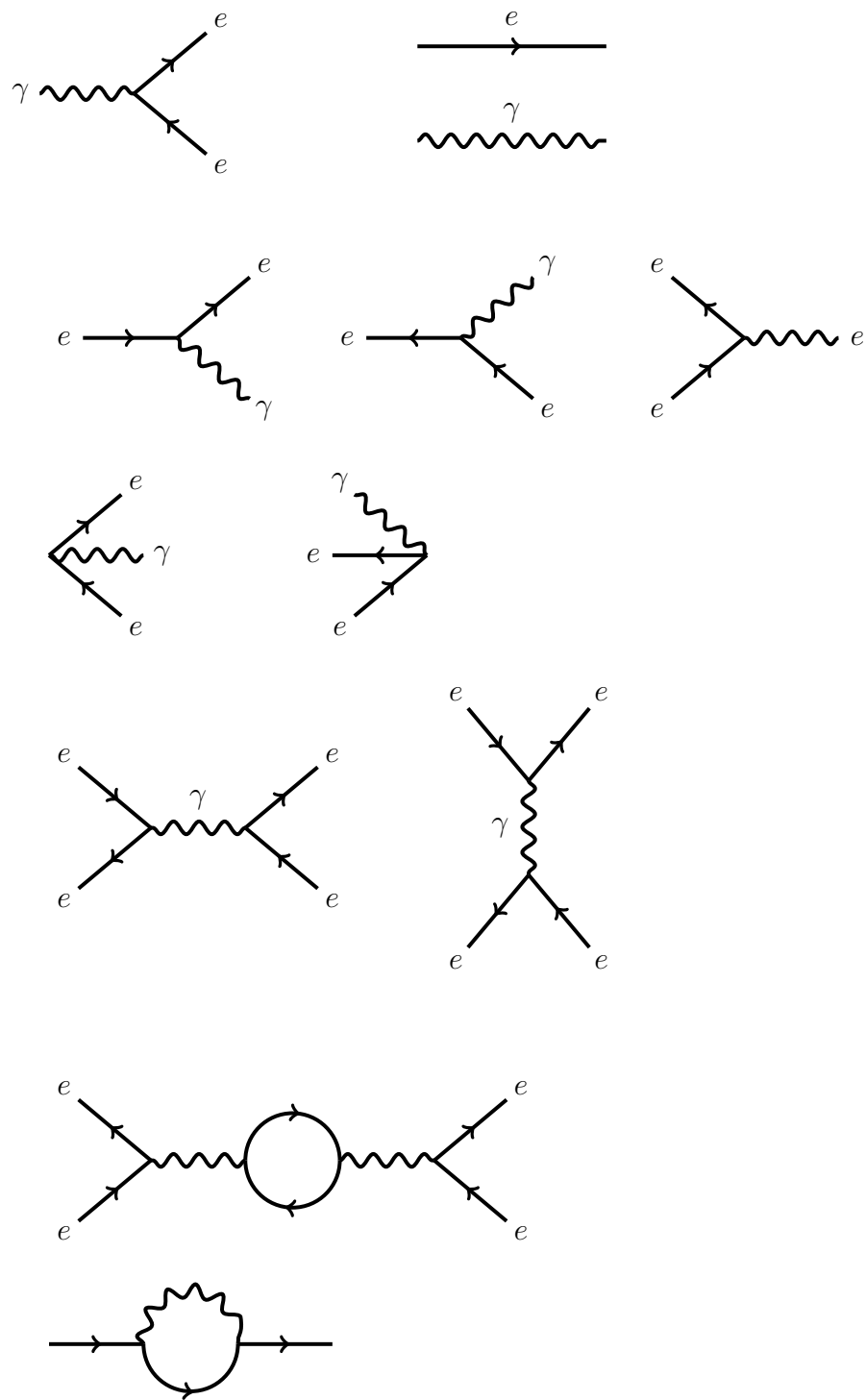
**This version:** August 19, 2015

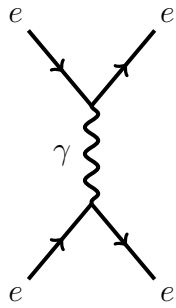
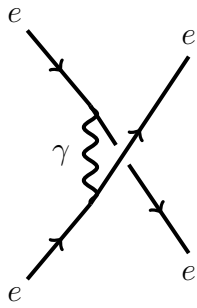
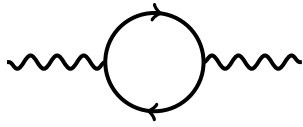
## **Abstract**

These are sample Feynman diagrams.

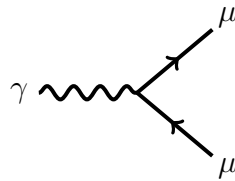
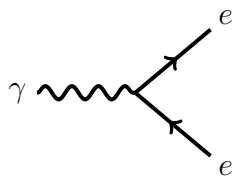
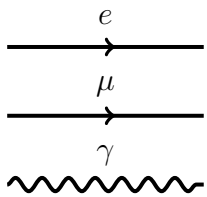
## **Contents**

# 1 QED

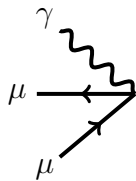
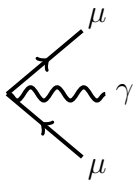
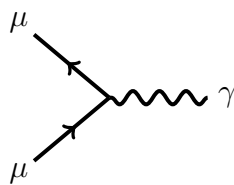
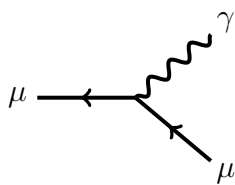
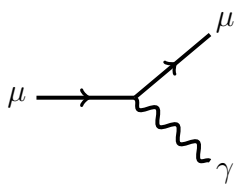
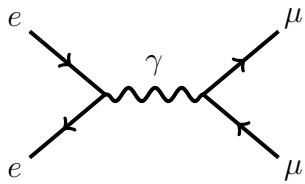




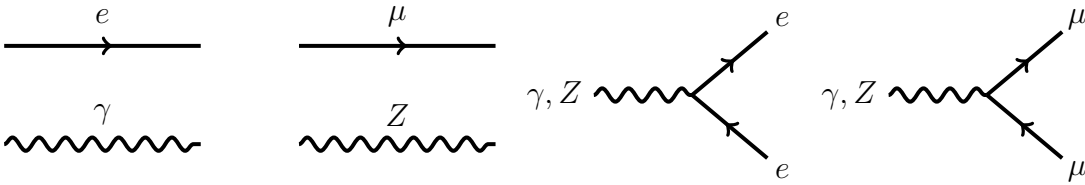
## 2 QED+ $\mu$



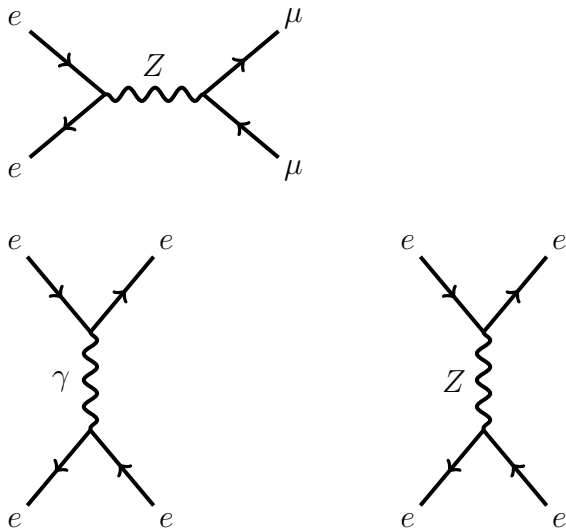
Electrons to muons



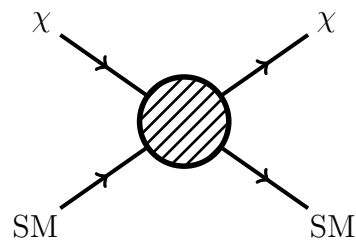
### 3 QED+Z+ $\mu$



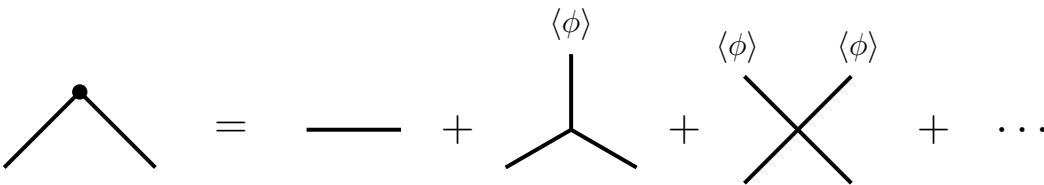
Electrons to muons via  $Z$



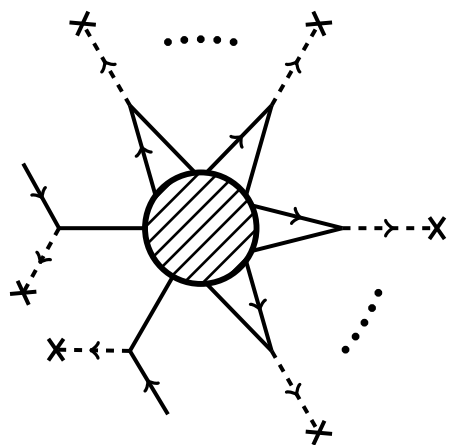
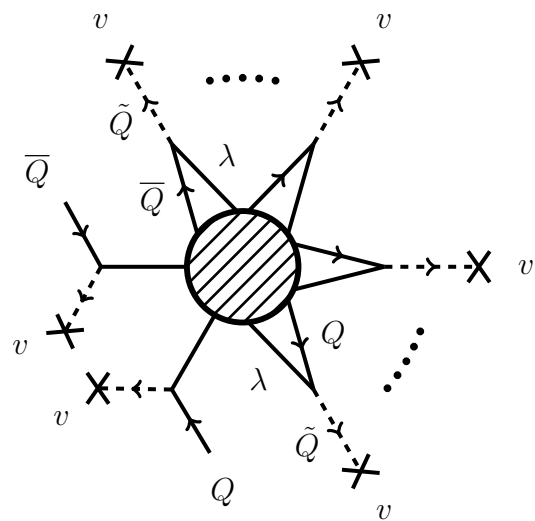
### 4 Blob diagrams



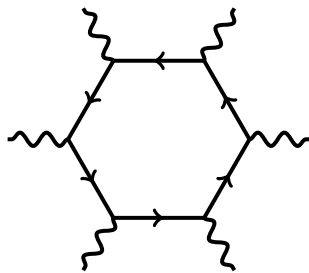
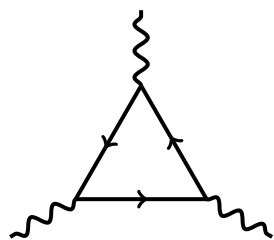
### 5 Coleman Weinberg



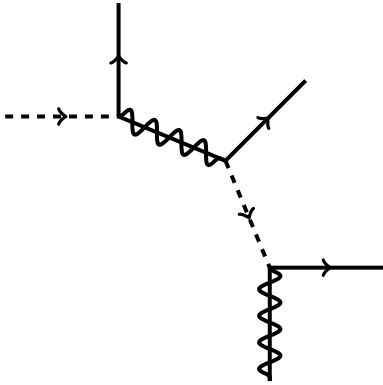
# 6 't Hooft operator



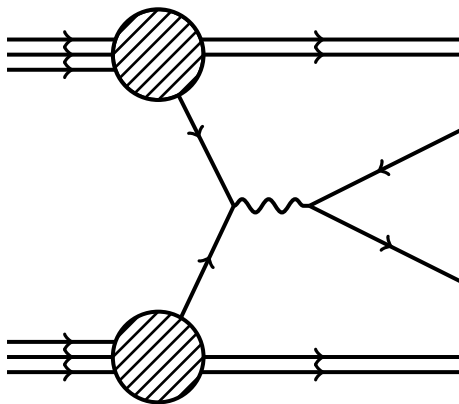
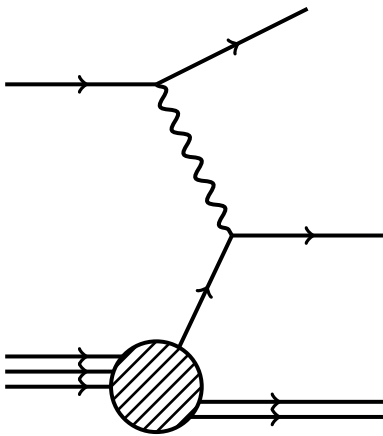
# 7 Anomaly



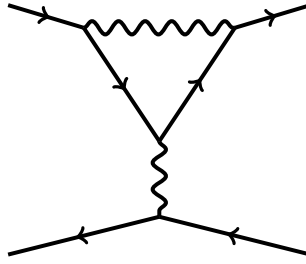
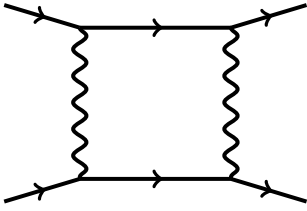
## 8 SUSY Cascade



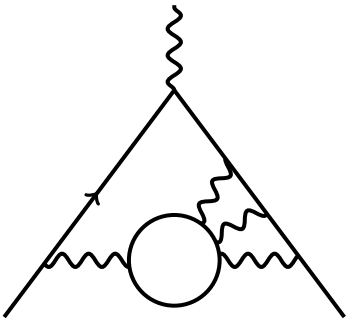
## 9 Hadronic interactions



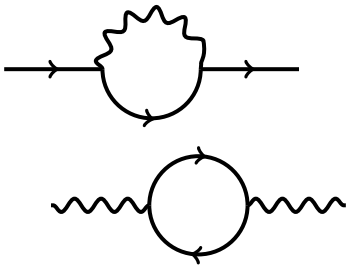
## 10 Flavor (box and penguins)



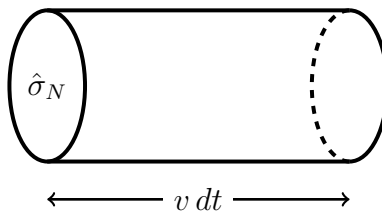
## 11 Multiloop



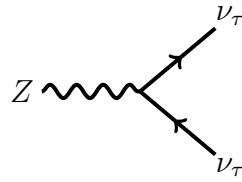
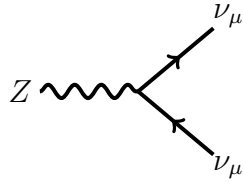
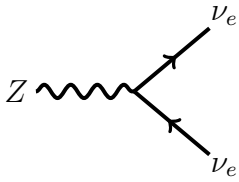
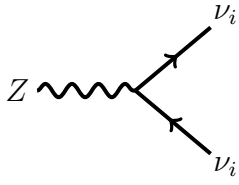
## 12 Renormalization



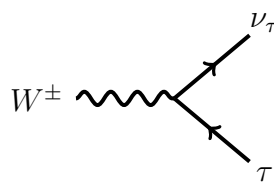
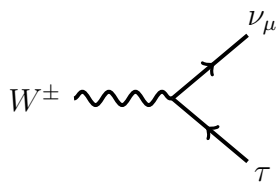
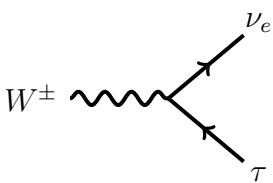
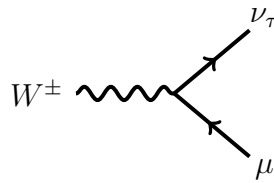
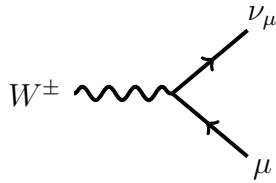
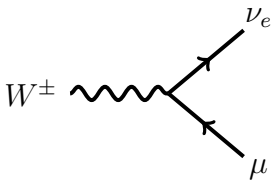
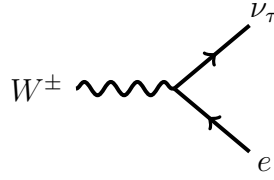
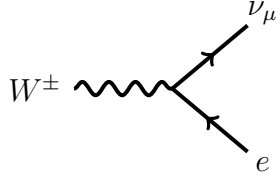
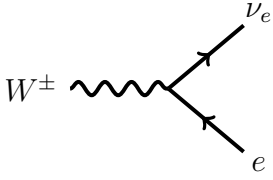
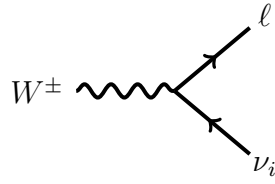
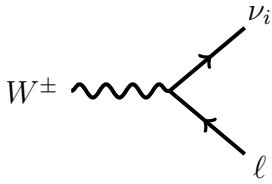
## 13 Cross section



## 14 $Z$ boson

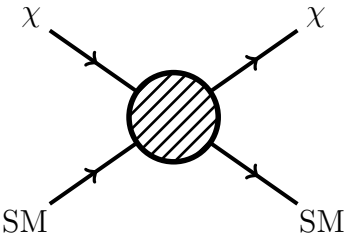


## 15 $W$ boson





# 16 Dark Matter



# 17 Coleman Weinberg

A Feynman diagram equation illustrating the Coleman-Weinberg mechanism. On the left is a loop diagram (a triangle with a dot at the top vertex). This is set equal to a series of terms: a horizontal line, followed by a plus sign, a tree-level diagram with a vertical line labeled  $\langle\phi\rangle$  attached to the top vertex, followed by a plus sign, a crossed-line diagram with two vertical lines labeled  $\langle\phi\rangle$  attached to the top vertices, followed by a plus sign and an ellipsis ( $\dots$ ).

# Acknowledgements

... This work is supported in part by the NSF grant number PHY-0355005, an NSF graduate research fellowship, and a Paul & Daisy Soros Fellowship For New Americans. The contents of this article do not necessarily represent the views of either institution.