Lab_05

Fantastic Four

Guiding Question

What is the relationship between the resulting spectra after the ionization of partices? What variation occurs for each spectra, spec5 and spec10? What covaritation occurs?

Overall Findings

most frequent occurances for low mass/charge ratios spec5 is slighlty more common *wide range of resulting spectra values (0,400) and negative values (broad span of data) **need to filter and isoltate data in order to draw meaningful analysis
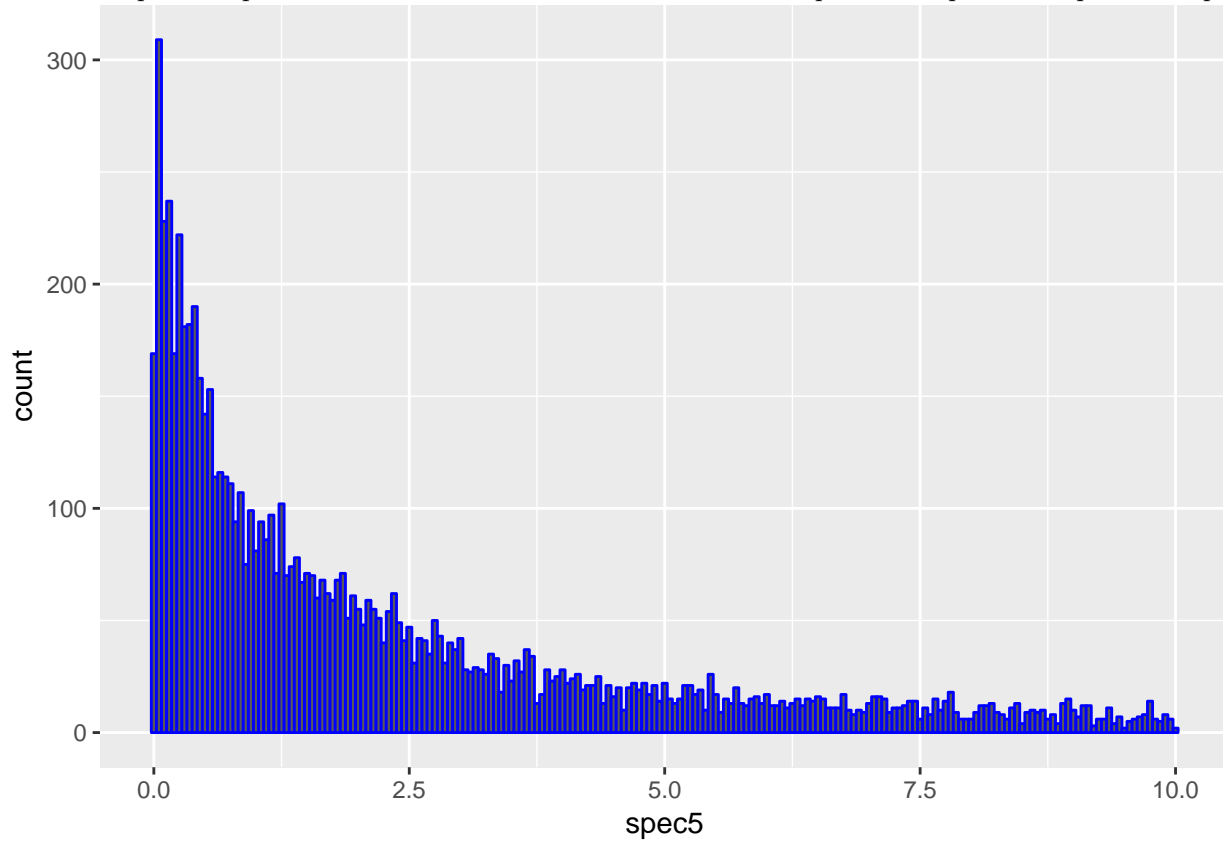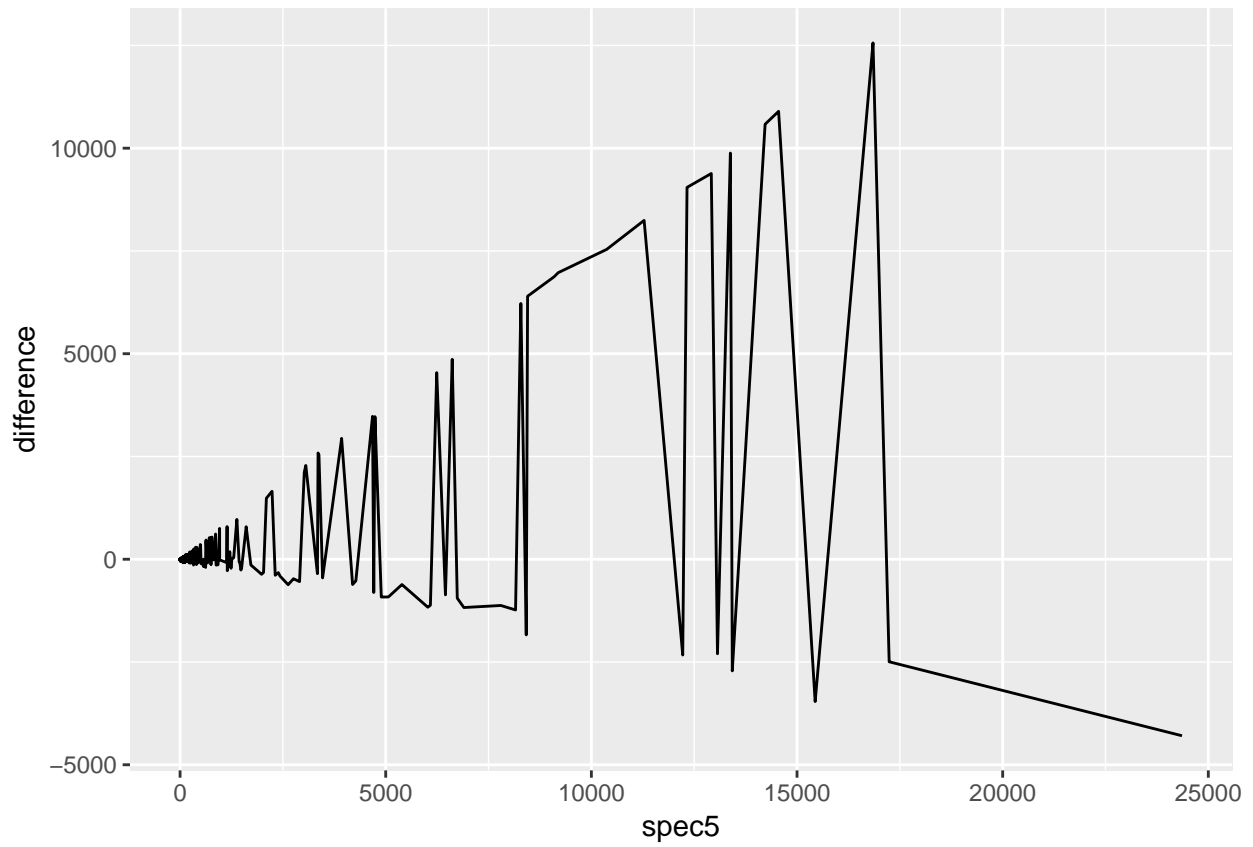
Conclusion

Recommendation

Individual Findings

Lexie Marinelli

Here is a plot of spec5 raw data and of the difference between spec5 and spec10 compared to spec5.

The first graph shows the relationship for spec5 as it gets larger, the occurance of those values faces an exponential decrease.

The second graph tells us that as the value for spec5 increases, the difference between the values of spec5 and spec10 increase and oscillates to form a v shape.

Lindsay Gettel

Positive spec10 measurments by mass


Distribution of spec10
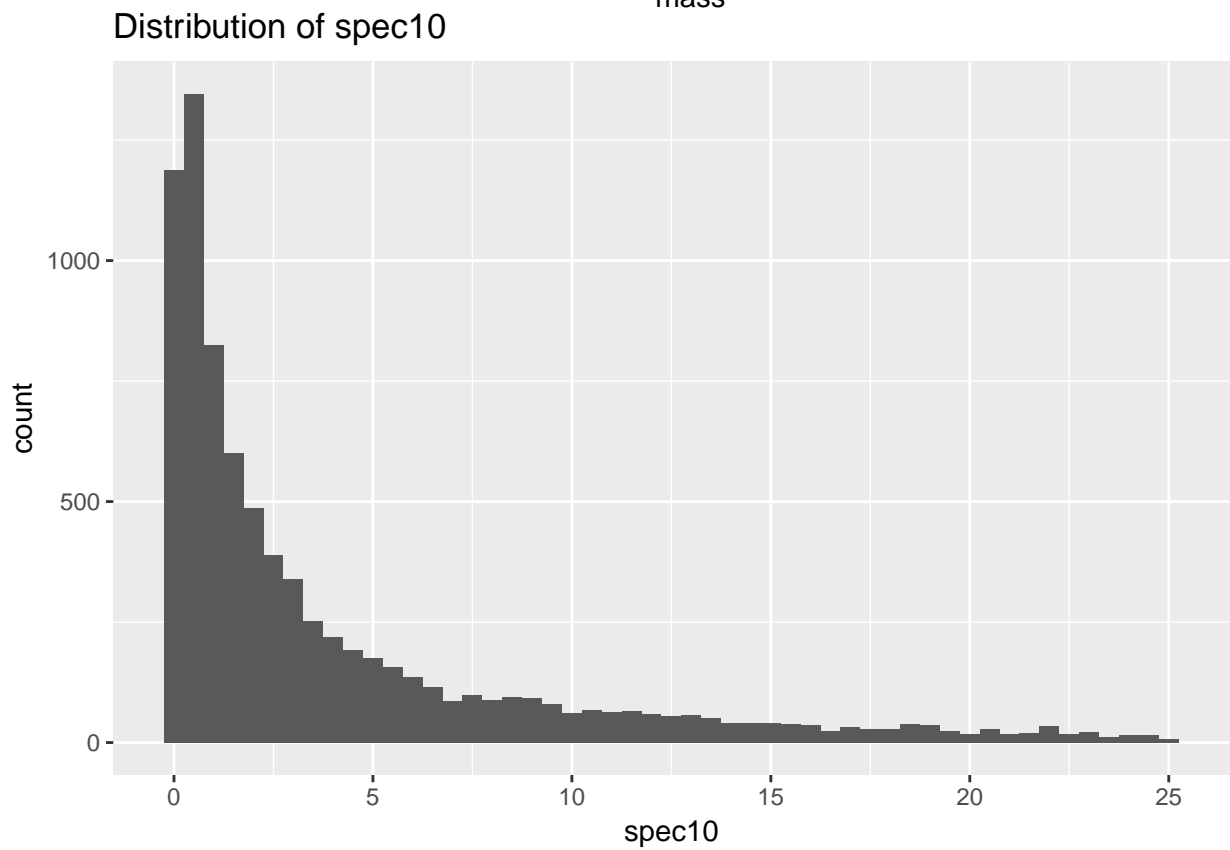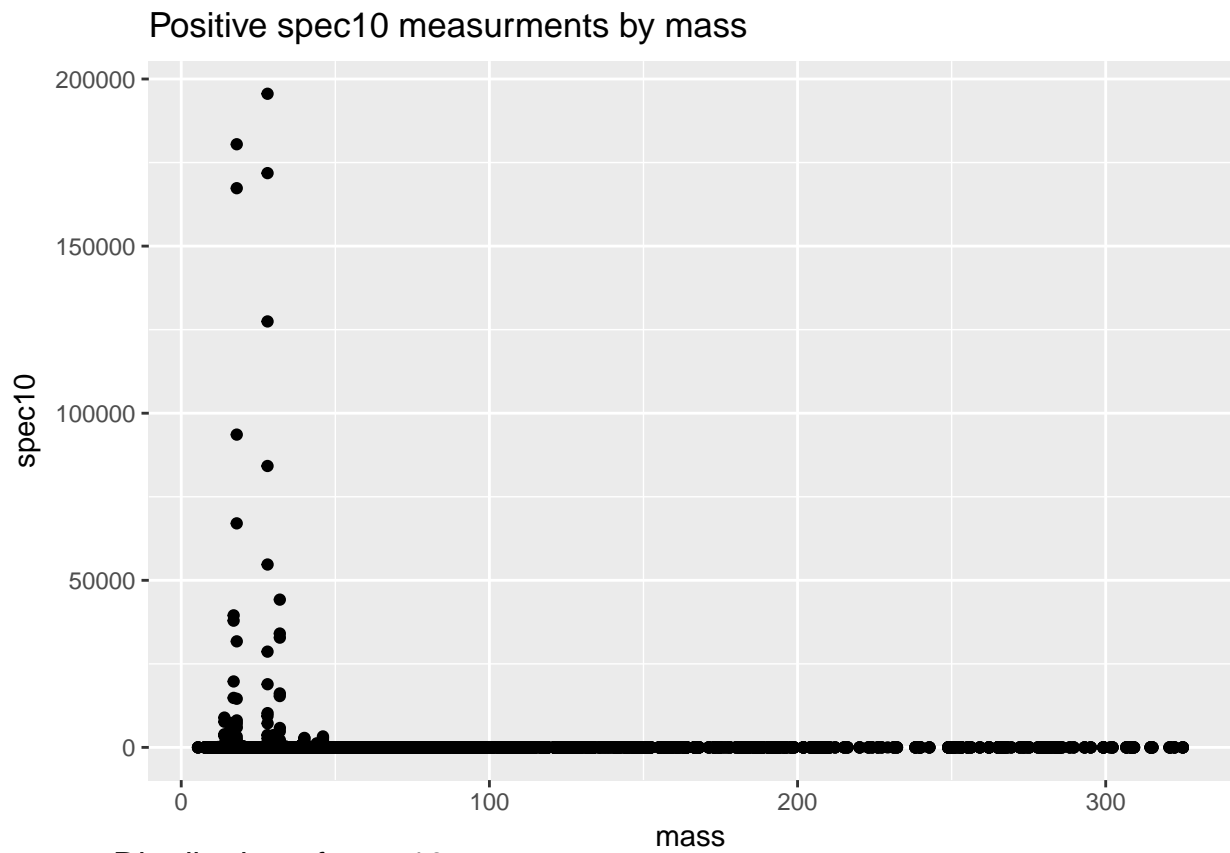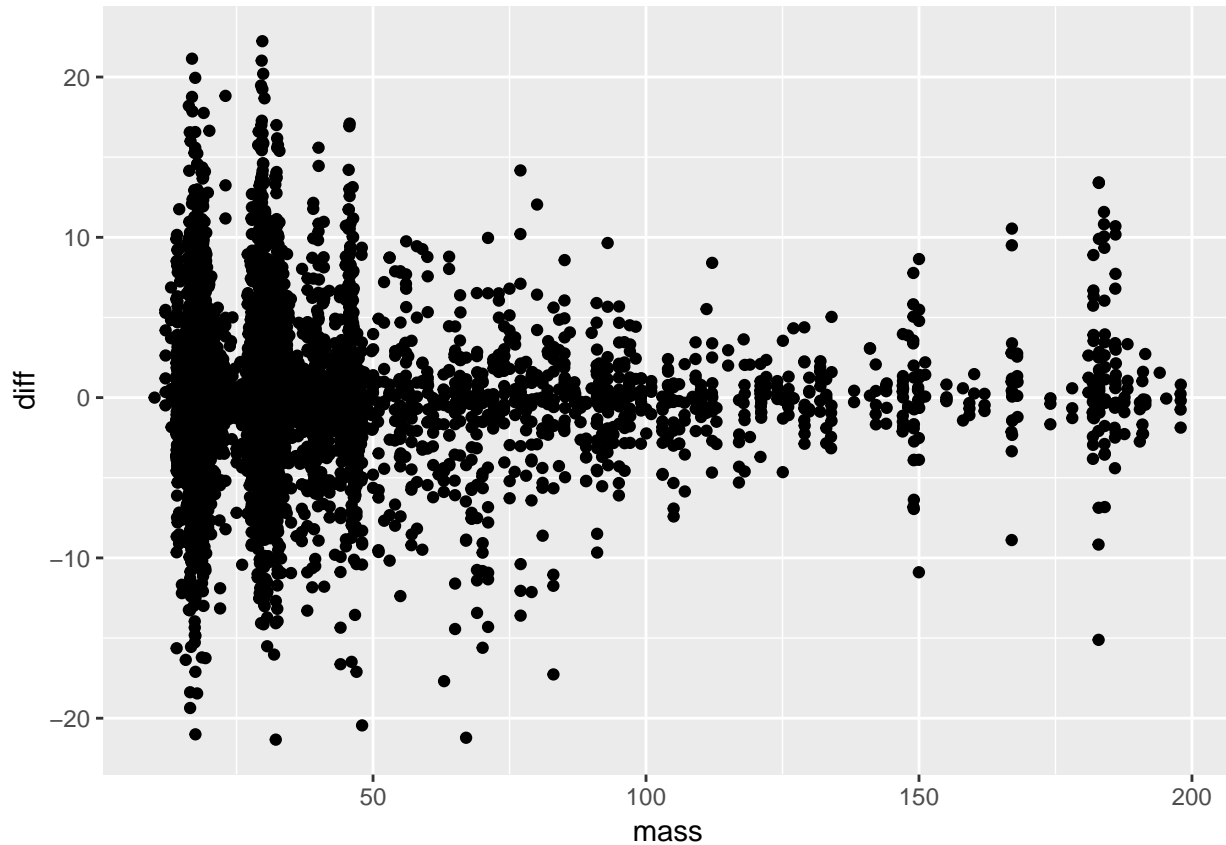
The first graph illustrates the mass charge ratio of the particles which produced a spectra of spec10. The graph illustrates that there were a variety of paticle masses which resulted in low output spectra. There were a few high valued outputs, that seem to be only from low mass. The second graph portrays the number of particles that were measured for a given spectra output.The values ranged from 0 to roughly 400, however, the most data was isolated in the range 0 to 25. The most prominate measurements occured for spec10 at values less than5. The third graph models the differences between the spec5 and spec10. This shows that between the two spectra outputs, are most frequent for smaller masses. At smaller masses there is also a greater difference in the values of spec5 and spec10.

Frequency of spec10 measurements
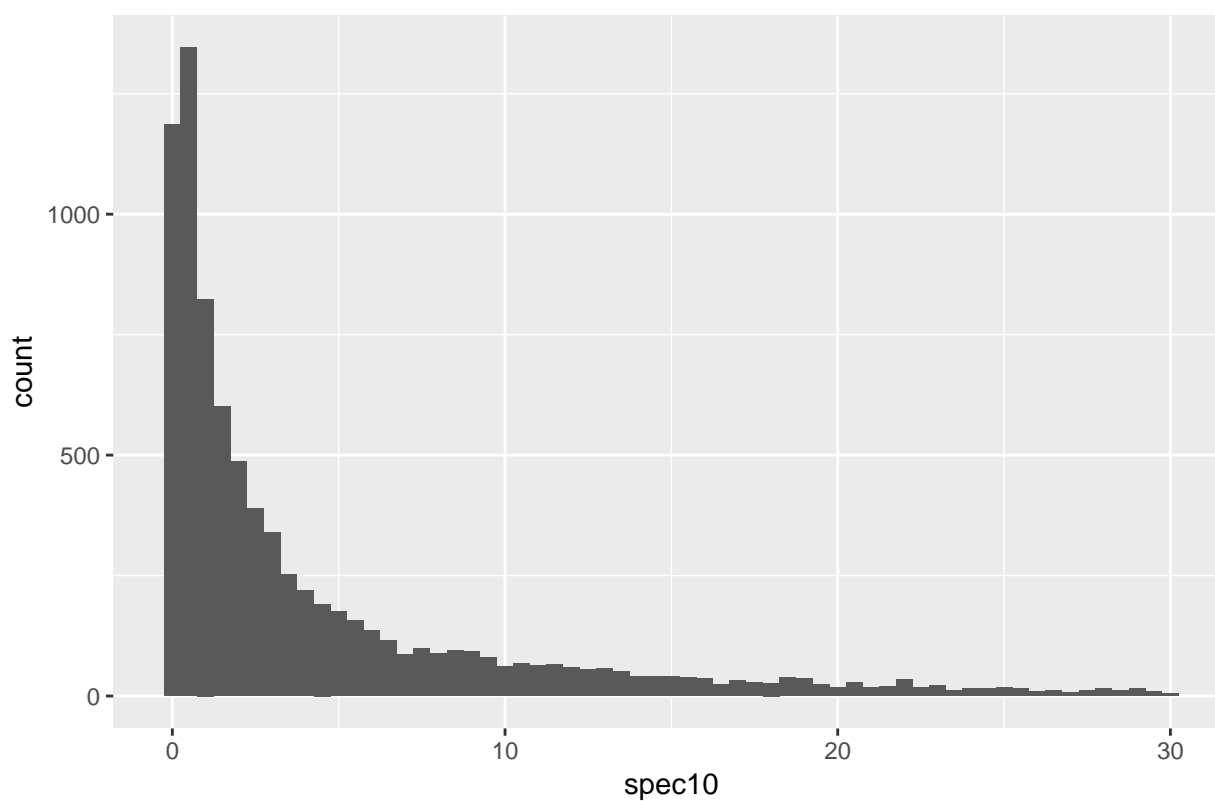

```
## `geom_smooth()` using method = 'gam'

## Warning: Removed 174 rows containing non-finite values (stat_smooth).

## Warning: Removed 174 rows containing missing values (geom_point).

## Warning: Removed 2 rows containing missing values (geom_smooth).
```

Mass vs. spec10

spec10 and spec5 comparison
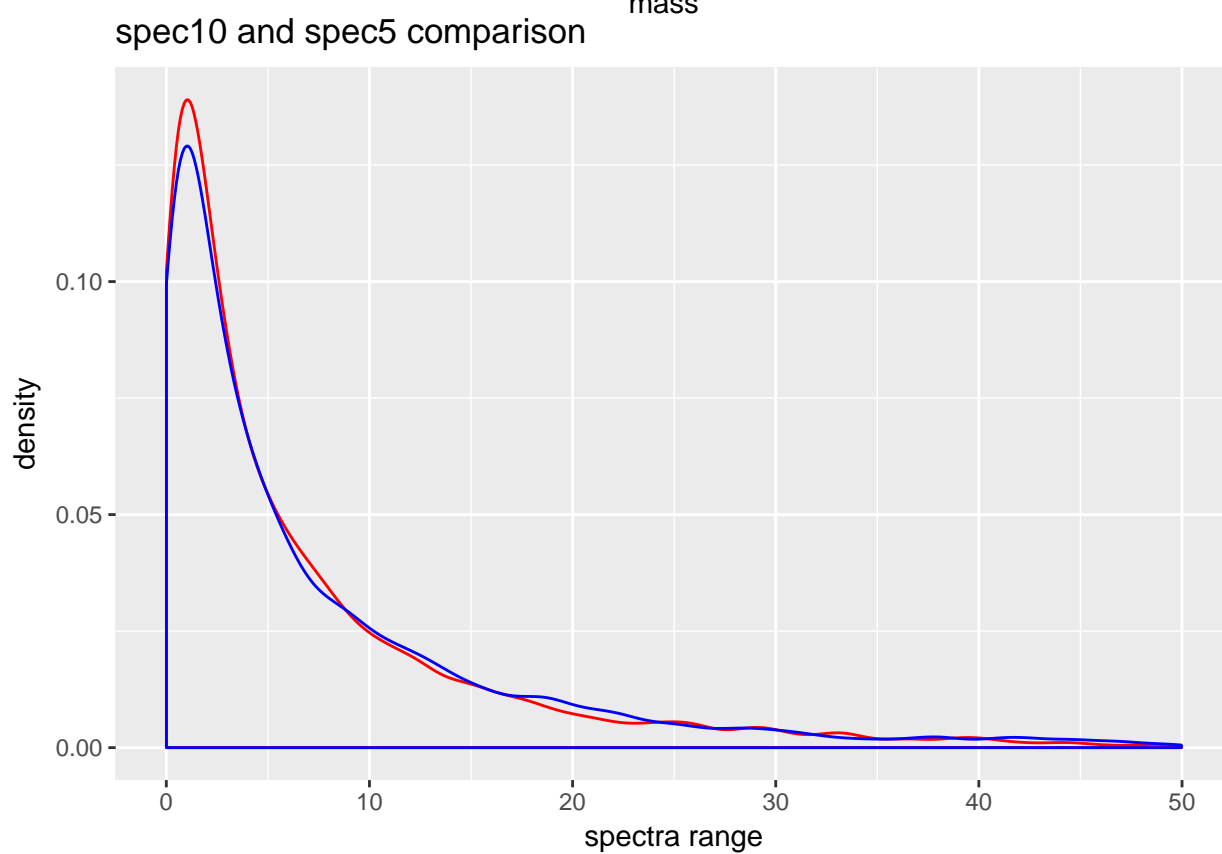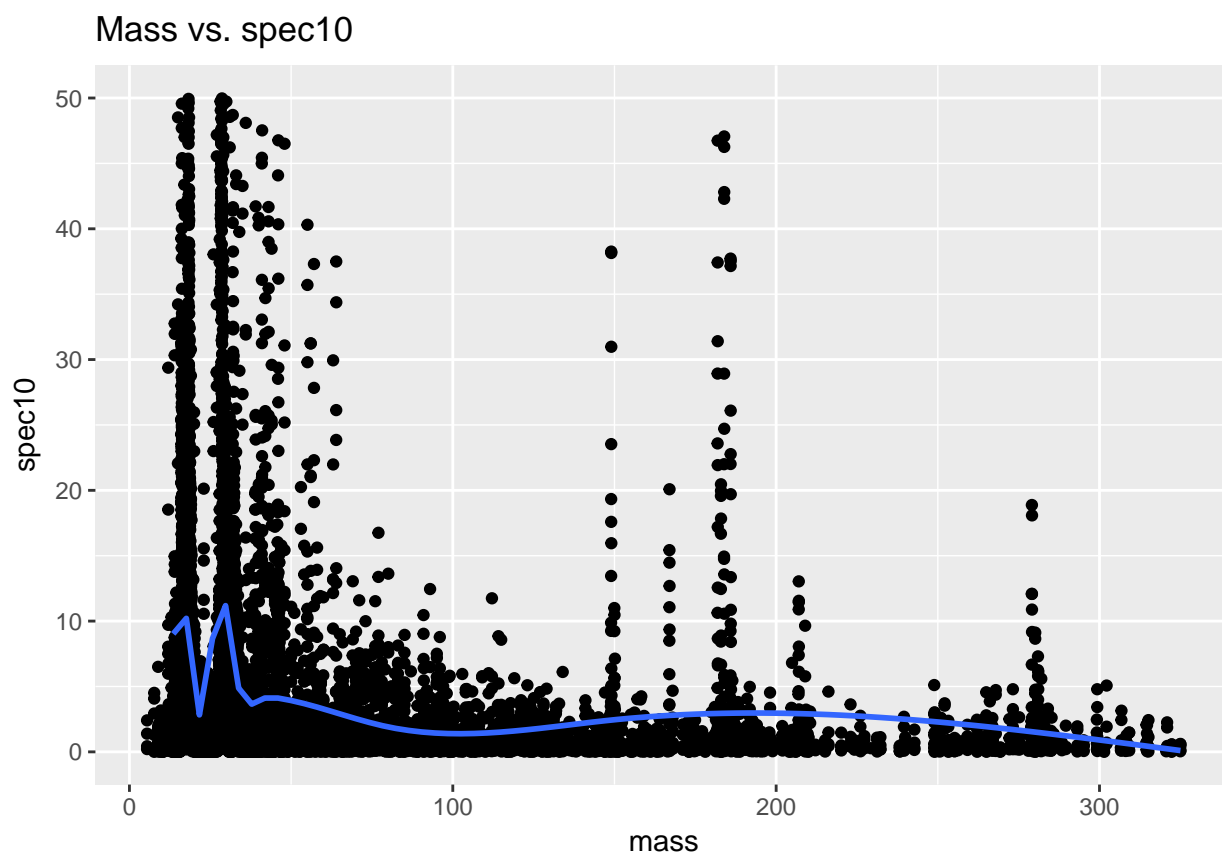
The next(first and second) graph depicts the range of spec10 values, limited by 30, and the number of

occurances of that value within the data set. Similar to the spec5, most of the measurments of spec10 were for lower values, around 5, the number of vlaues greately decreases and spec10 values above 30 are very sparce, and therefore were not included in the graph. The final graph shows the frqencey of measurements for both spec5 and spec10. They have similar trends, a higher concentration of low spectra values, but spec5 occurs silghtly more often for low spectra values.

Zhenlong Li

```
## [1] 0.9952781
```
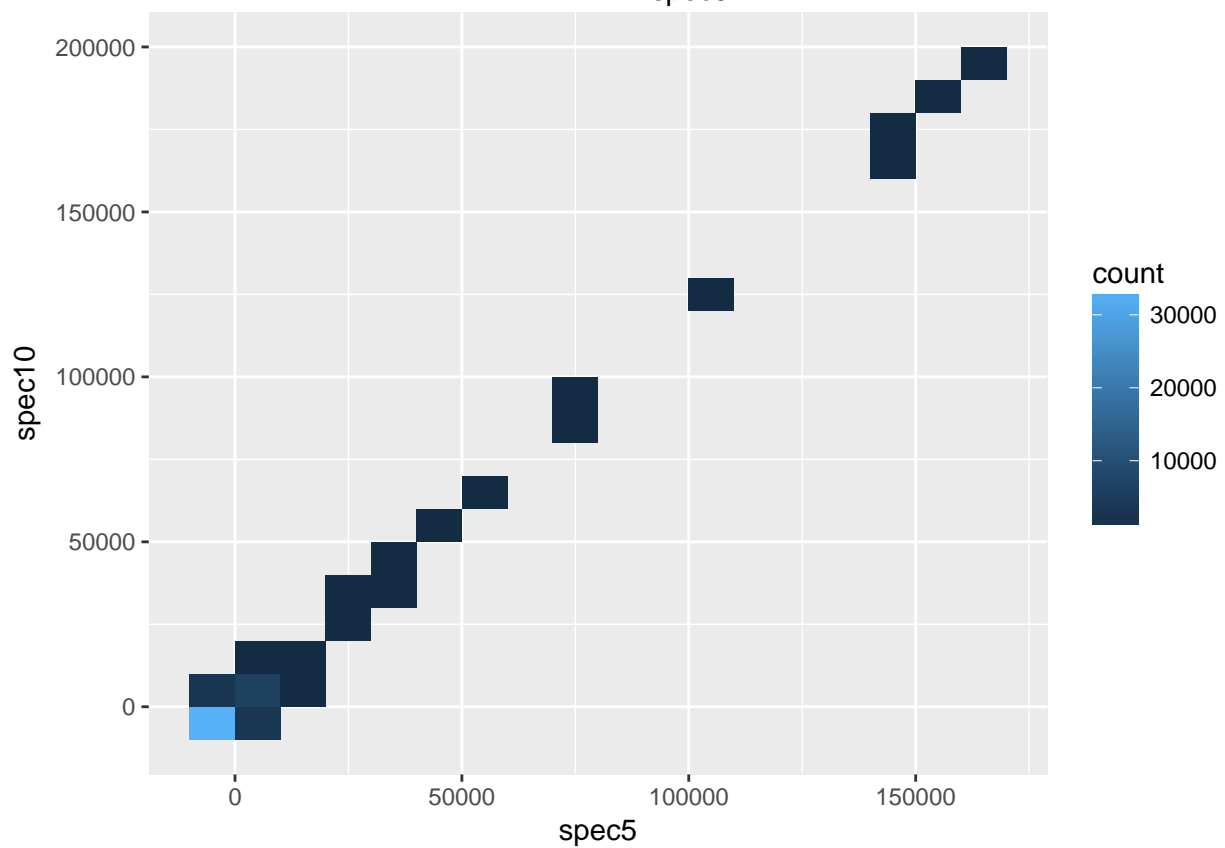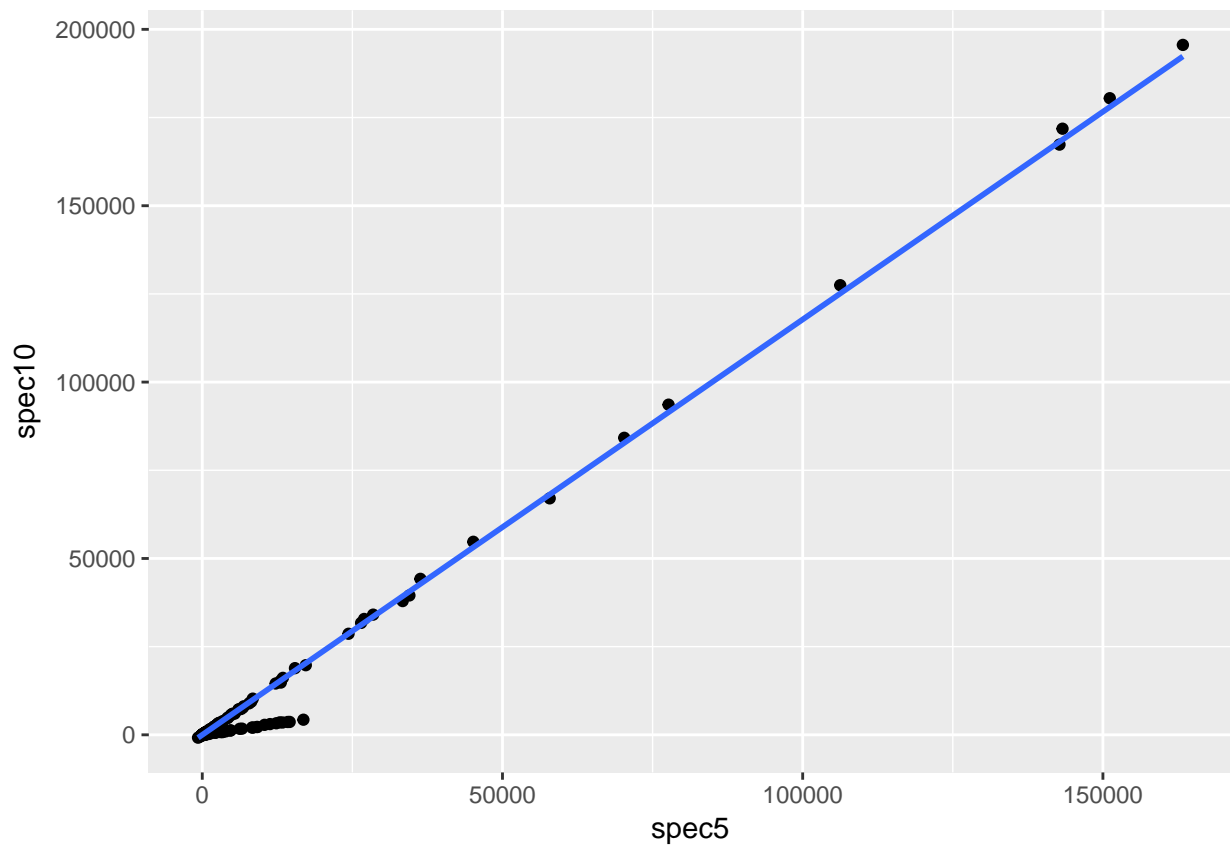
The two different plots shows the correlation between spec5 and spec10. They are in a linear relationship but

there are two different regression line, so I plot bin2d plot which shows that the relation between them also depends on the number of data points. Overall, spec5 and spec10 are in strong correlation according to the calculated covariance.

Scott Baker

The first two plots show the variation on a logarithmic scale for the spec5 and spec10 variables.

```
var(ms$spec5)
```

```
## [1] 2830876
```

```
var(ms$spec10)
```
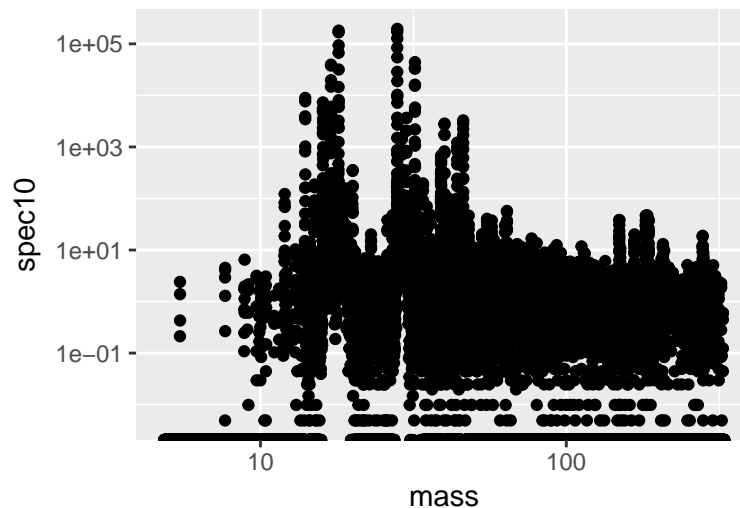
```
## [1] 3963210
```

Here is a plot of the relationship between the spec10 and mass variables on a logarithmic scale:

```
## Warning in self$trans$transform(x): NaNs produced
```

```
## Warning: Transformation introduced infinite values in continuous y-axis
```

```
## Warning: Removed 838 rows containing missing values (geom_point).
```


Here is a plot of the relationship between the spec5 and mass variables on a logarithmic scale:

```
## Warning in self$trans$transform(x): NaNs produced
```

```
## Warning: Transformation introduced infinite values in continuous y-axis
```

```
## Warning: Removed 893 rows containing missing values (geom_point).
```

Log Plot of spec5 vs. mass

The covariance between the spec5 and spec10 is:

```
cor(ms$spec5,ms$spec10)
```
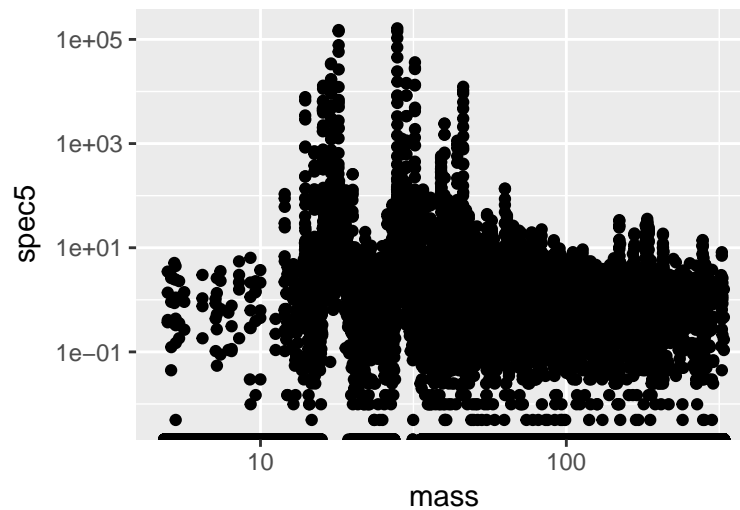
```
## [1] 0.9952781
```

Here is a plot of the relationship between the spec5 and spec10 variables on a logarithmic scale:

```
## Warning in self$trans$transform(x): NaNs produced
```
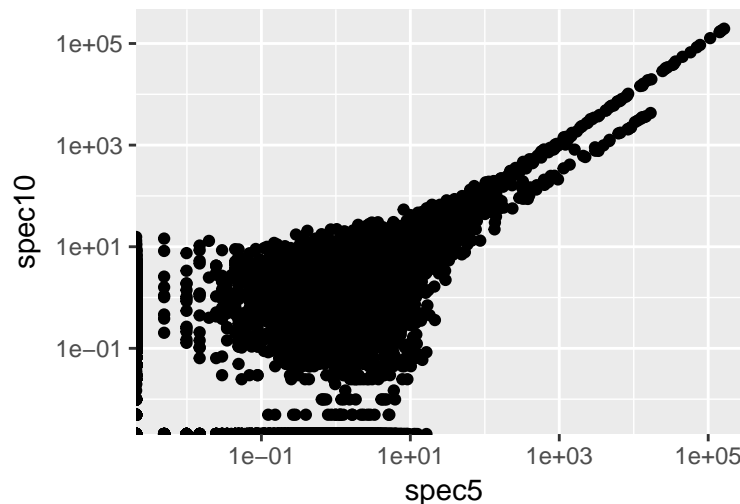
```
## Warning: Transformation introduced infinite values in continuous x-axis
```

```
## Warning in self$trans$transform(x): NaNs produced
```

```
## Warning: Transformation introduced infinite values in continuous y-axis
```

```
## Warning: Removed 1690 rows containing missing values (geom_point).
```

Log Plot of spec5 vs. spec10

Contributions

- Lindsay: Created a histogram plot to see significant values of spec10, as well as to get a sense of the distribution of the data. For comparing spec5 to spec10, made a density plot to see how frequently each occured and to determine if one spectra was more common than the other. To narrow the data filtered it all by positve values less than 50, it seemed to be the best range where majority of the data existed.

- Lexie:

- Li:

- Scott: Created graphs on a logarithmic scale, since there is data on lots of orders of magnitude. Responsible for knitting this document and submitting to OSF. Finally, dealt with git organization and management.