

# File Types



# Uploading Video

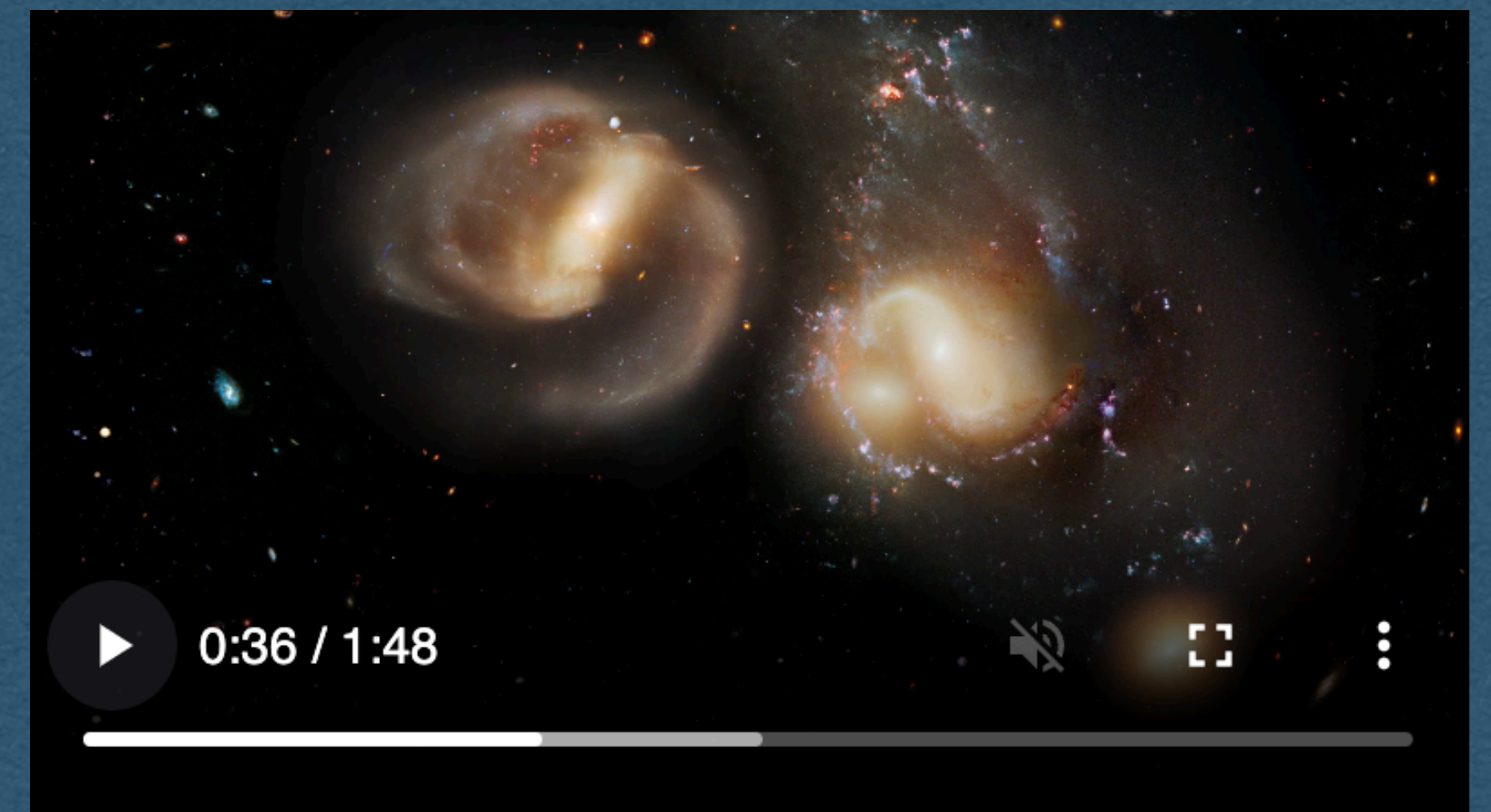
- We now support file uploads
  - We allow users to upload images
- How do we support video uploads?
  - The same exact way!
  - Files are just bytes
  - Images and videos are handled as bytes



# Displaying Video

- How do we display a video on our page?
  - Not the same as images (Can't use the `<img>` element)
- Use the `<video>` element!

```
<video width="400" controls autoplay muted>  
  <source src="space.mp4" type="video/mp4">  
</video>
```

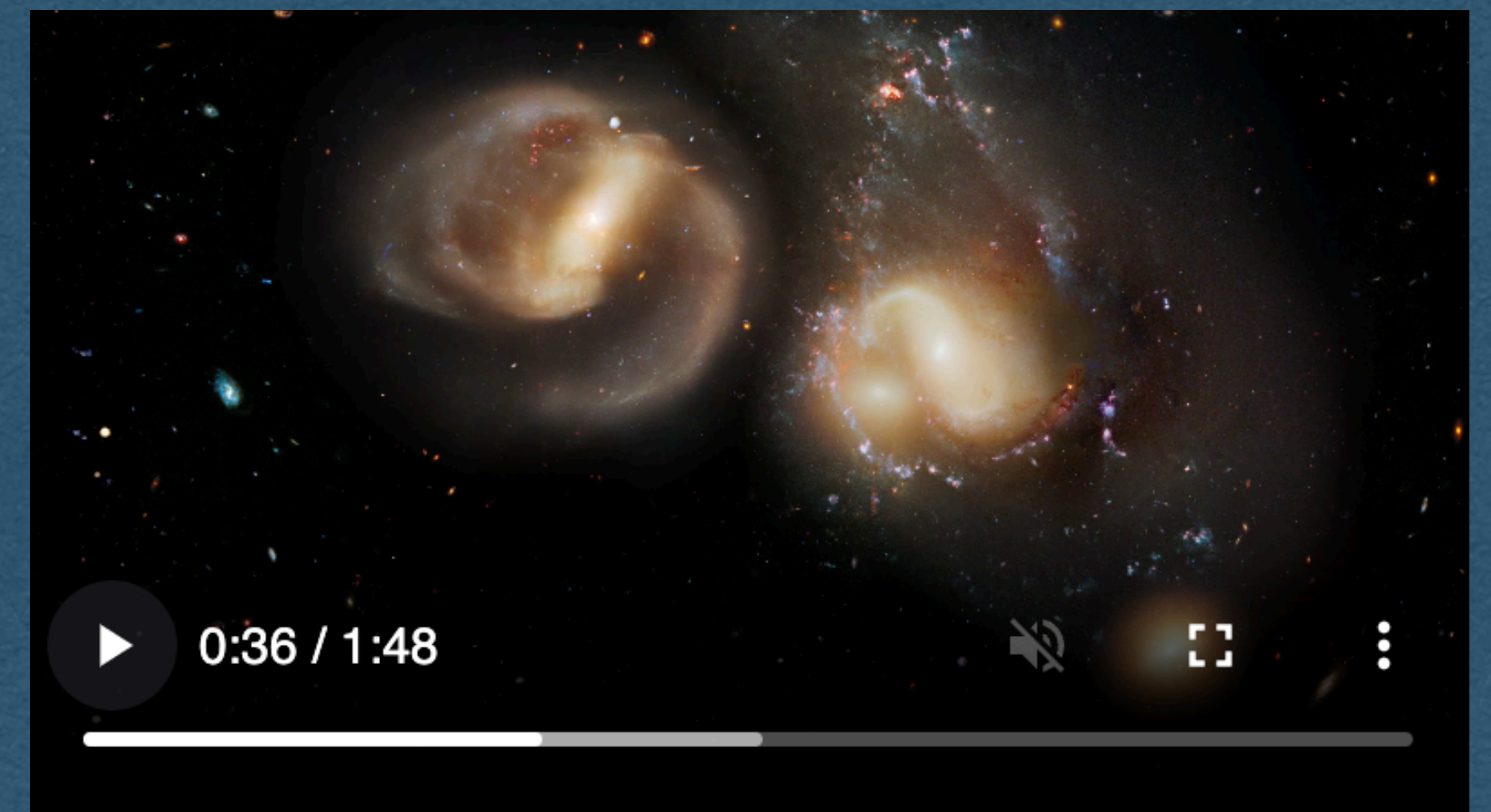




# Displaying Video

- Can add a variety of attributes to the video
  - controls: displays the control buttons for the user
  - autoplay: plays on page load [if allowed by the browser]
  - muted: mute the audio (Required in Chromium for autoplay)

```
<video width="400" controls autoplay muted>  
  <source src="space.mp4" type="video/mp4">  
</video>
```

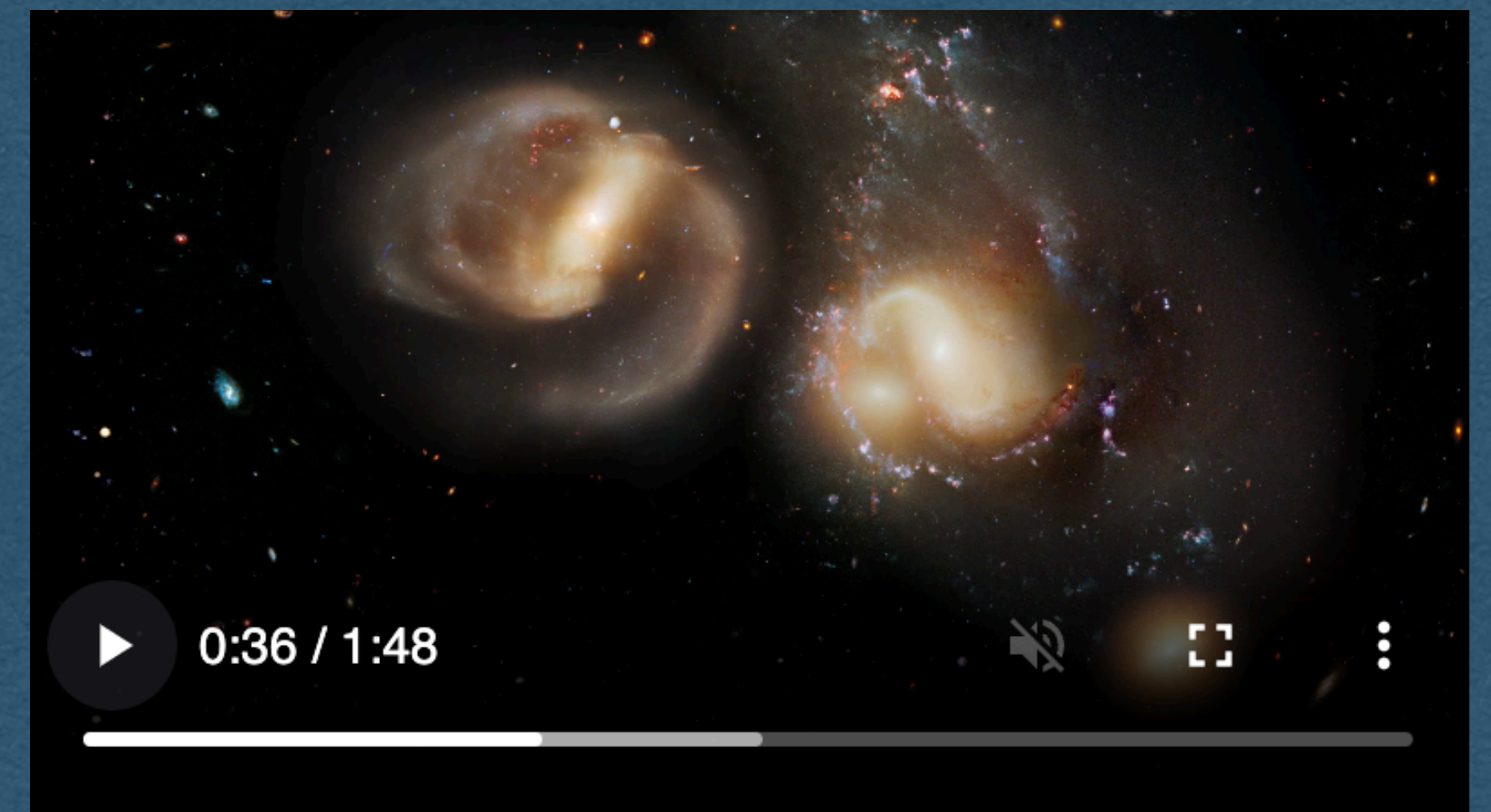




# Displaying Video

- Specify the source file in a source element
- If the MIME type is omitted, the browser might be able to sniff the type (Don't rely on this)
- This element will request "space.mp4" just like the src of an img

```
<video width="400" controls autoplay muted>  
  <source src="space.mp4" type="video/mp4">  
</video>
```

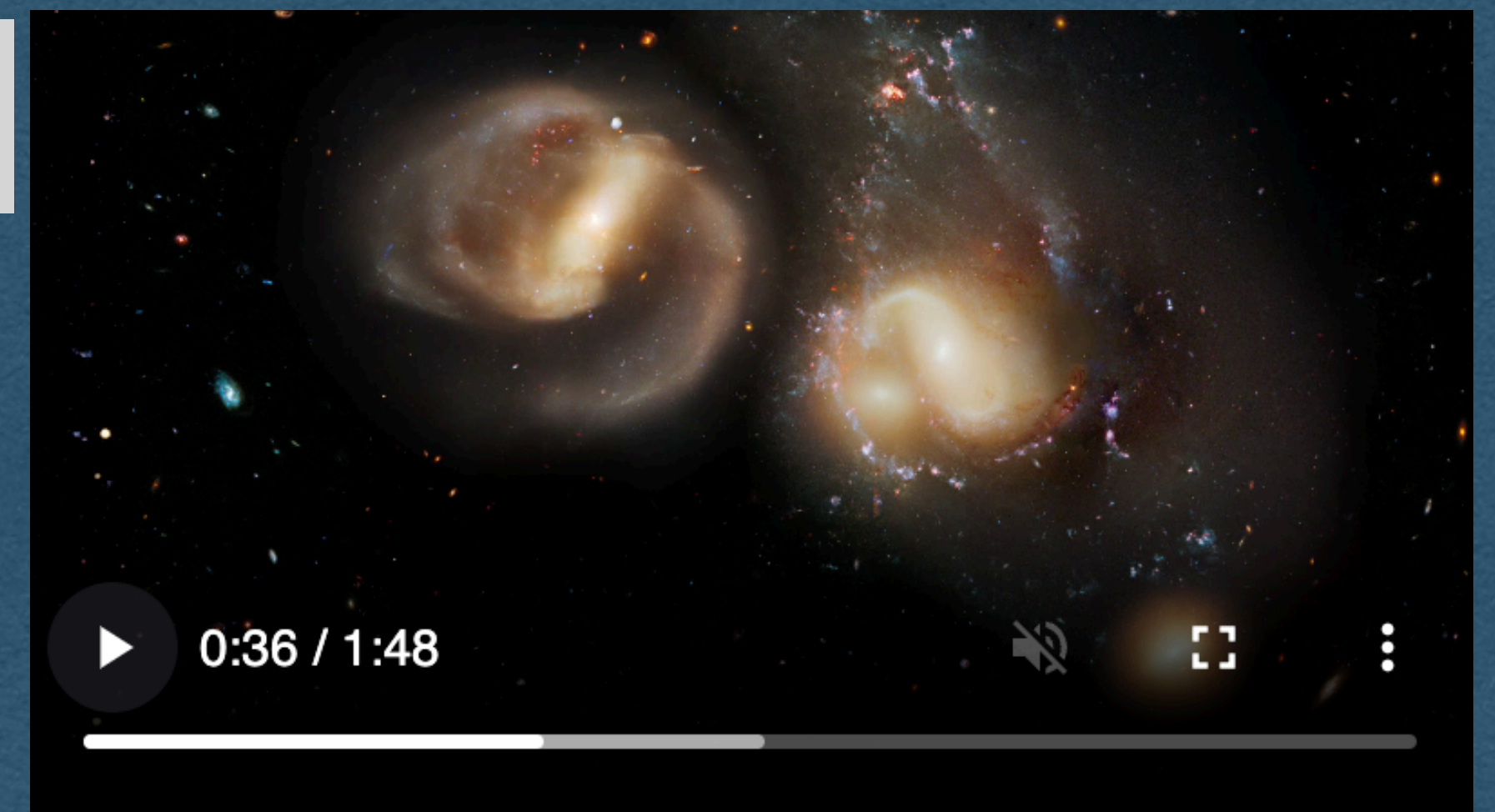




# Displaying Video

- Using the src attribute in the video element is allowed
  - This is discouraged
  - Cannot specify MIME type
  - Can only have one source

```
<video width="400" src="space.mp4" controls autoplay muted>  
</video>
```



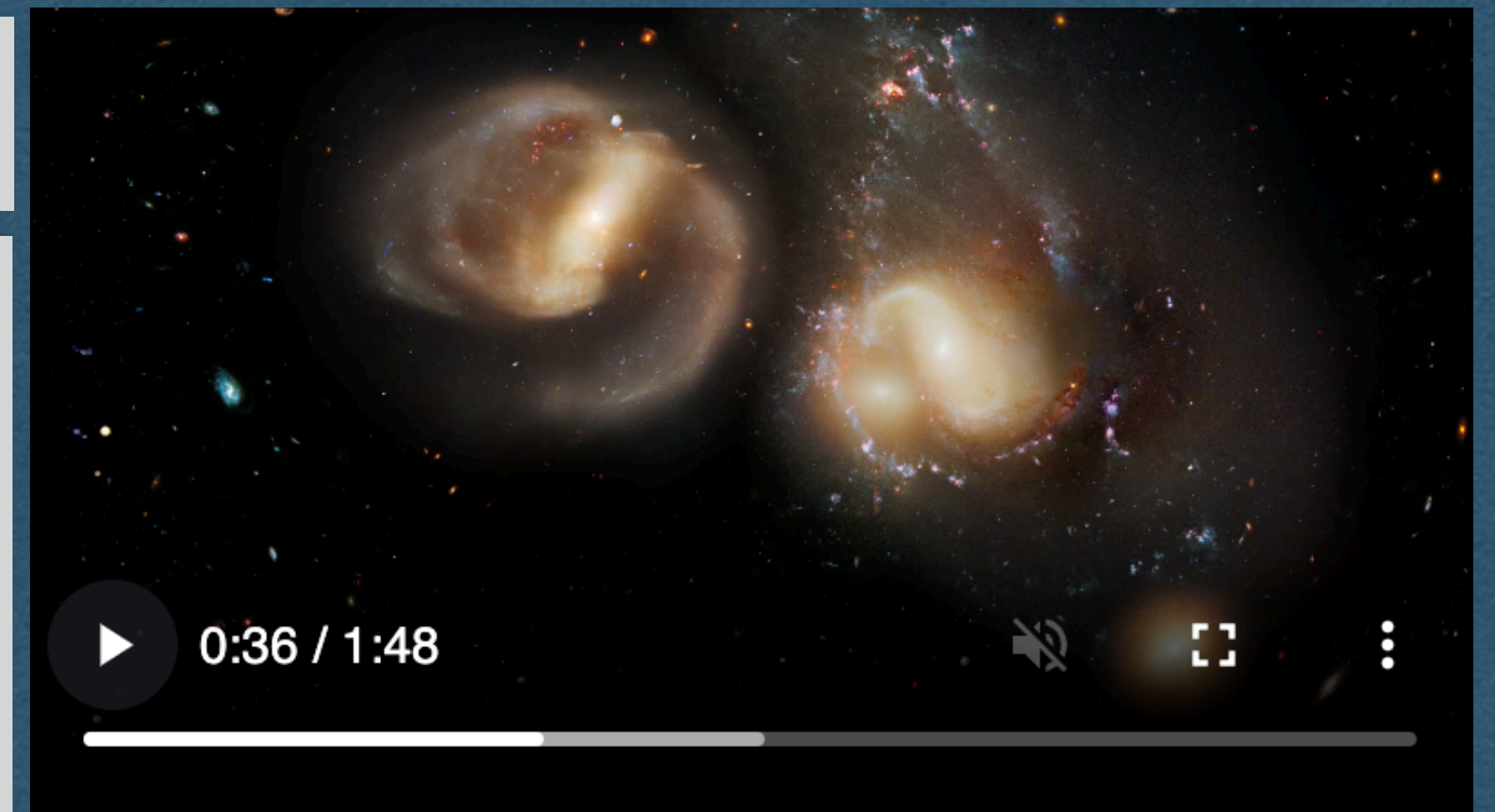


# Displaying Video

- Using the source element allows us to specify multiple formats
  - Browser will use the first source in the list that it supports
  - Most browsers do not support mpd or m3u8 and will play the mp4
- Add text that is displayed for very old browsers that don't support the HTML5 video element

```
<video width="400" src="space.mp4" controls autoplay muted>  
</video>
```

```
<video width="400" controls autoplay muted>  
  <source src="space.mpd" type="application/x-mpegURL">  
  <source src="space.m3u8" type="video/hls">  
  <source src="space.mp4" type="video/mp4">  
  Your browser does not support video playback  
</video>
```

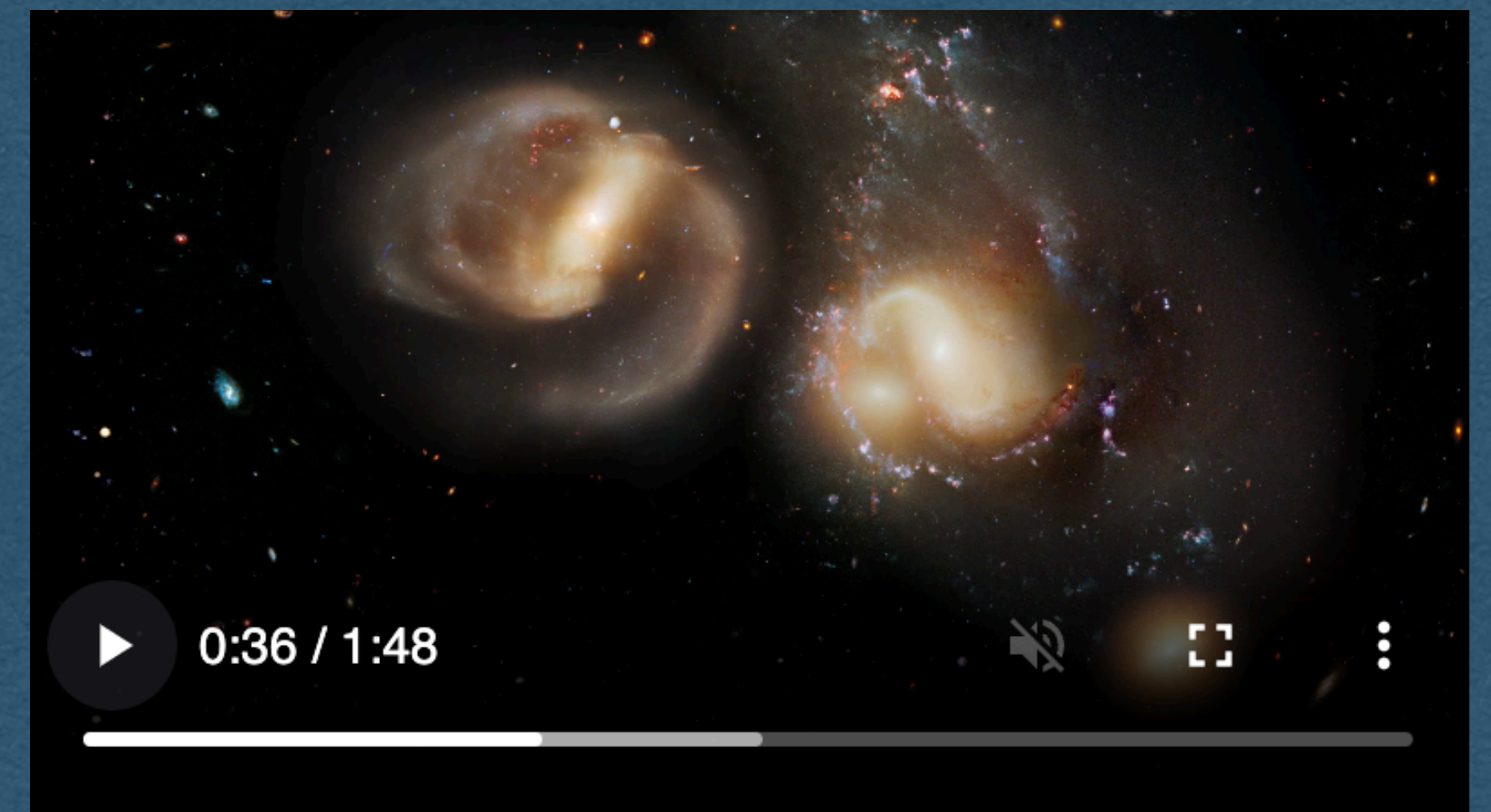




# Displaying Video

- Expectation for HW3 when a video is uploaded:
  - Save the video to disk
  - Create HTML with a video element and a source with the name of your video file
  - Add this HTML as the chat message for the uploading user

```
<video width="400" controls autoplay muted>  
  <source src="space.mp4" type="video/mp4">  
</video>
```





# File Formats



# File Formats

- How can we find the type of file that was uploaded?
- Check the file extension?..
  - No
- File extension pros:
  - Helpful for us humans to identify the type
  - Let's our OS recommend which program to use to open the file
- File extensions cons:
  - They are part of the filename and can be set to anything by renaming the file (Or removed entirely)
  - They are not part of the file itself (No filename when working with only the content of the file)



# File Formats

- How can we find the type of file that was uploaded?
- Check the Content-Type of the part of the request?..
  - No
- The browser might use the file extension to determine the Content-Type of an uploaded file
  - Cannot be trusted



# File Signatures

- The first bytes of each file contain a signature
  - Identifies the type of the file
  - Reliable(ish) since it's part of the content of the file itself instead of the filename
- When the file extension can't be trusted
  - Read the first bytes of the file
  - Lookup the signature of these bytes
- Common file types will always start with the same bytes
  - eg. JPEG images will start with
    - `b'\xff\xd8\xff\xe0\x00\x10JFIF\x00\x01'`
- Find the signatures for each file type you support and determine the MIME type matching the signature



# Examples