FFTs in Graphics and Vision

Michael Kazhdan

(601.760)
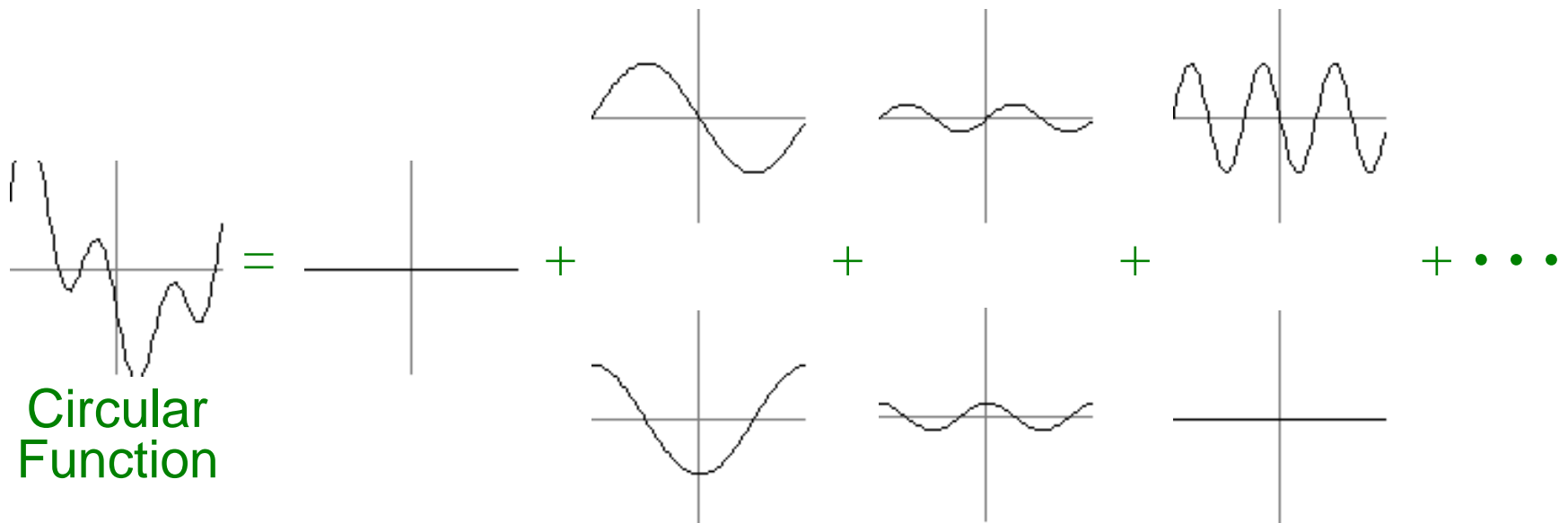
What are we studying?

- Signal Processing

- Representation Theory

- Alignment

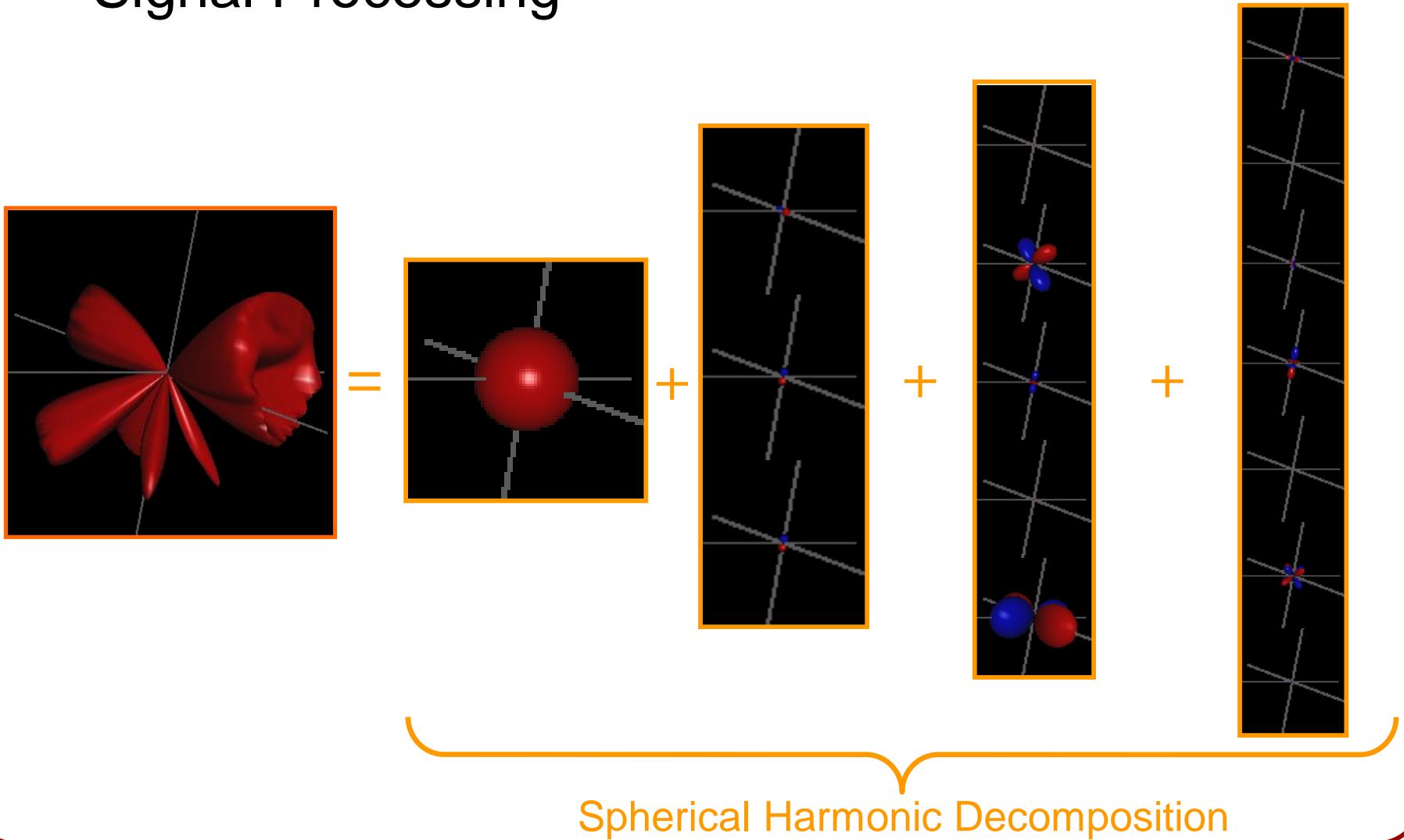- Symmetry Detection

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- Signal Processing

Circular Function = + + + + • • •

Cosine/Sine Decomposition

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Spherical Harmonic Decomposition
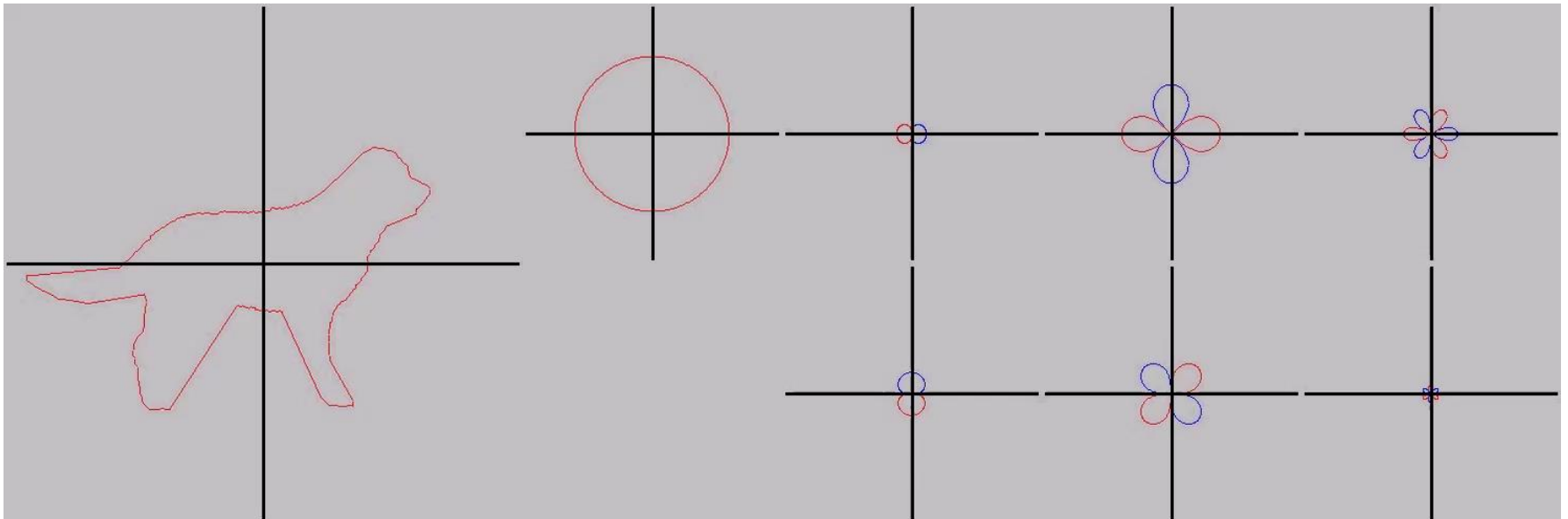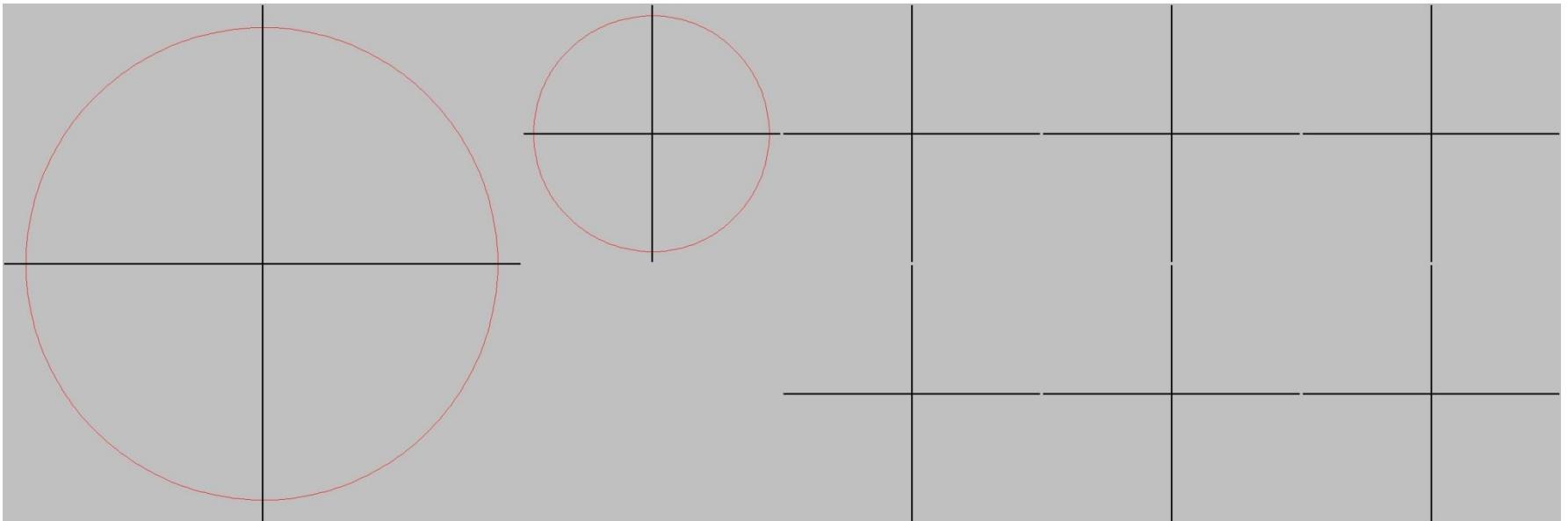
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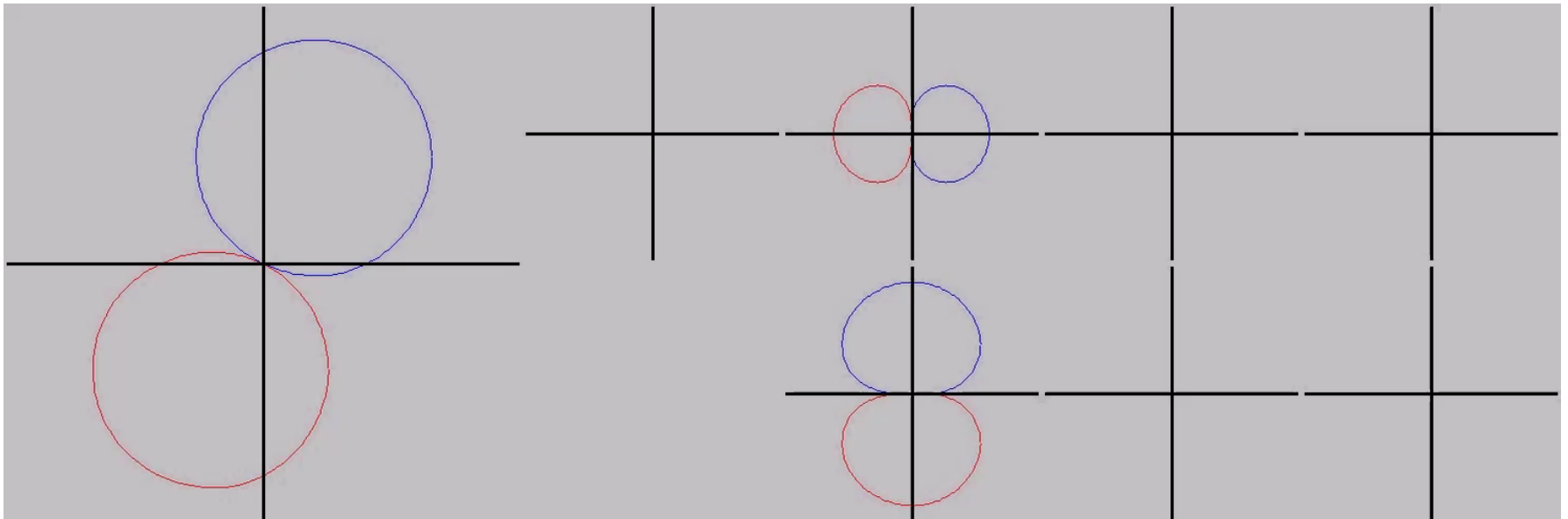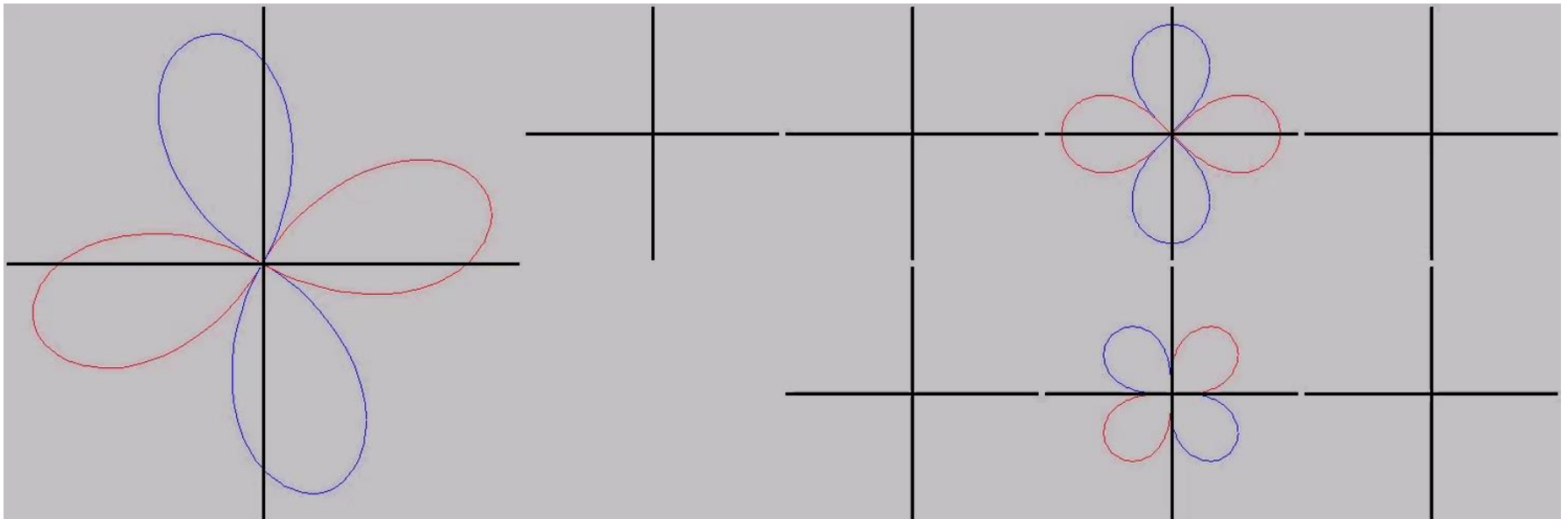
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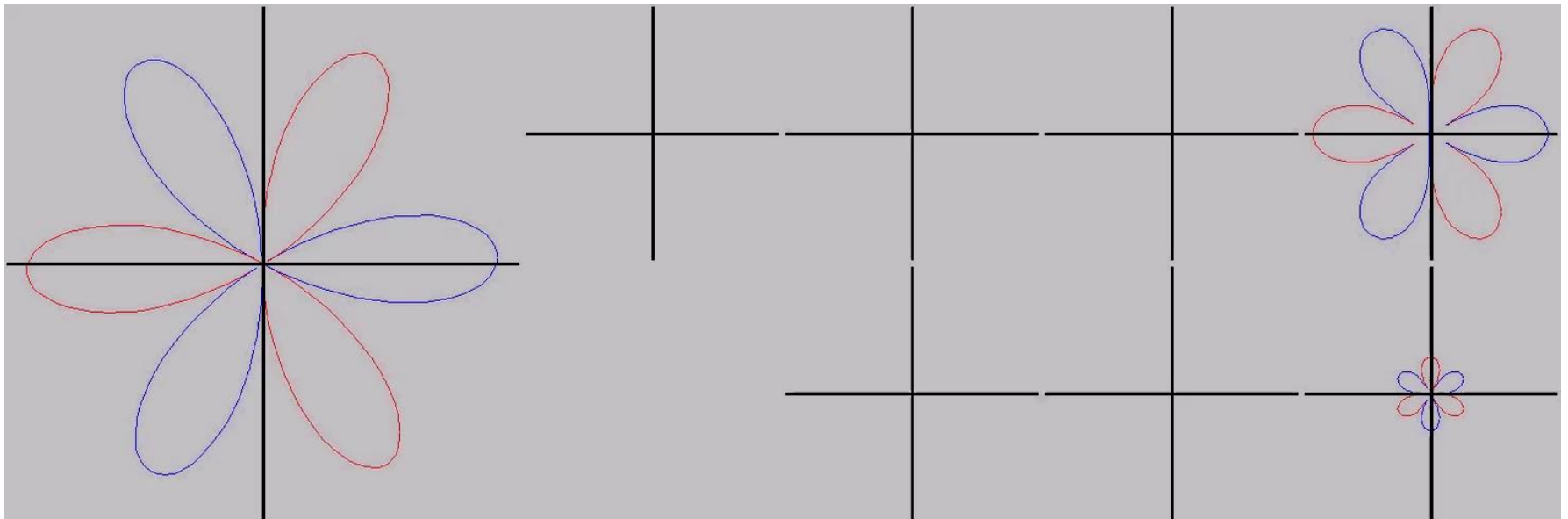
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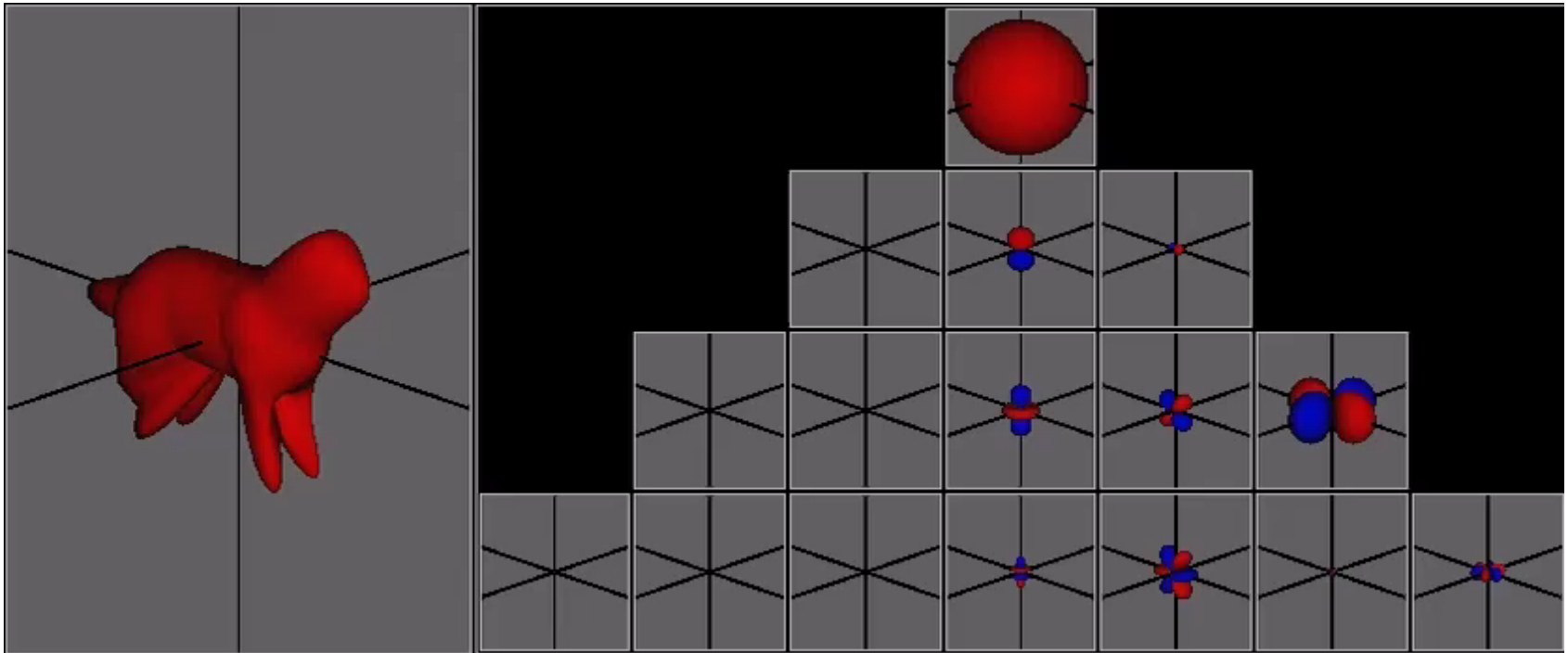
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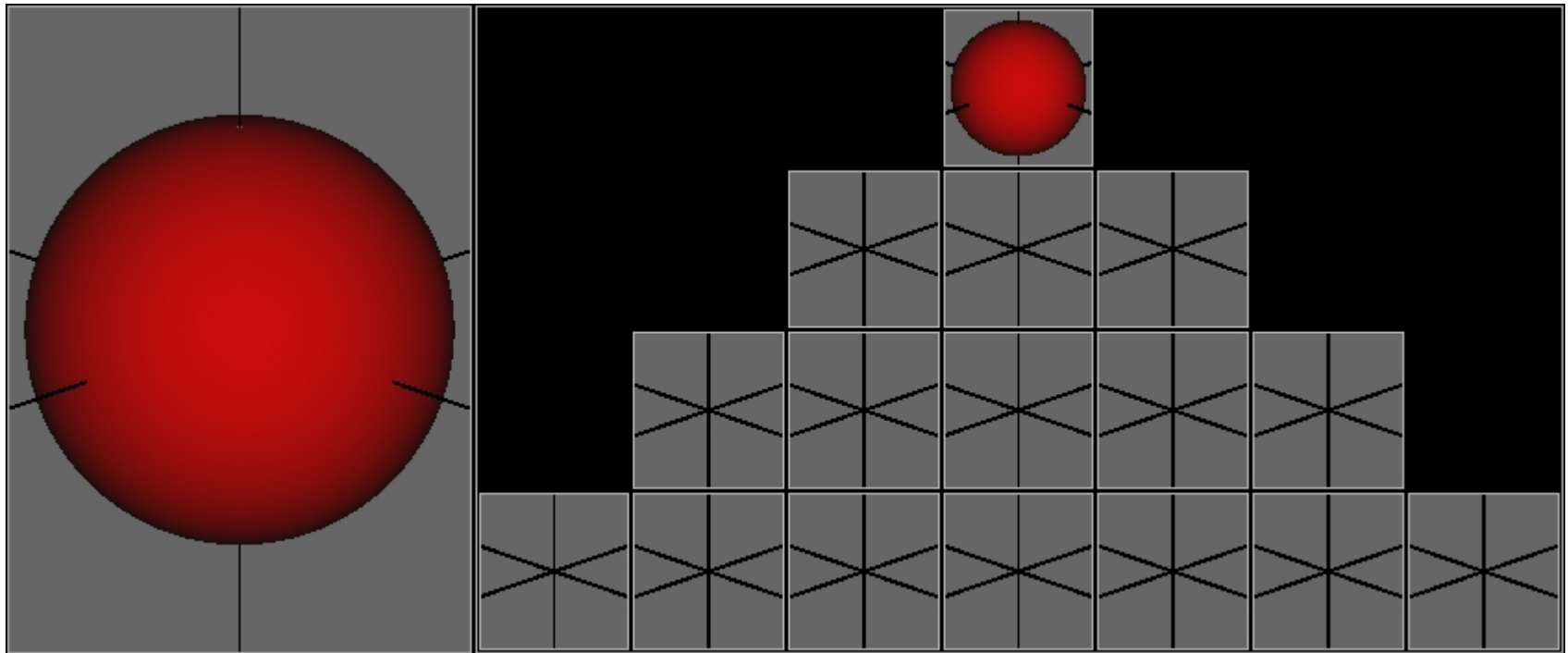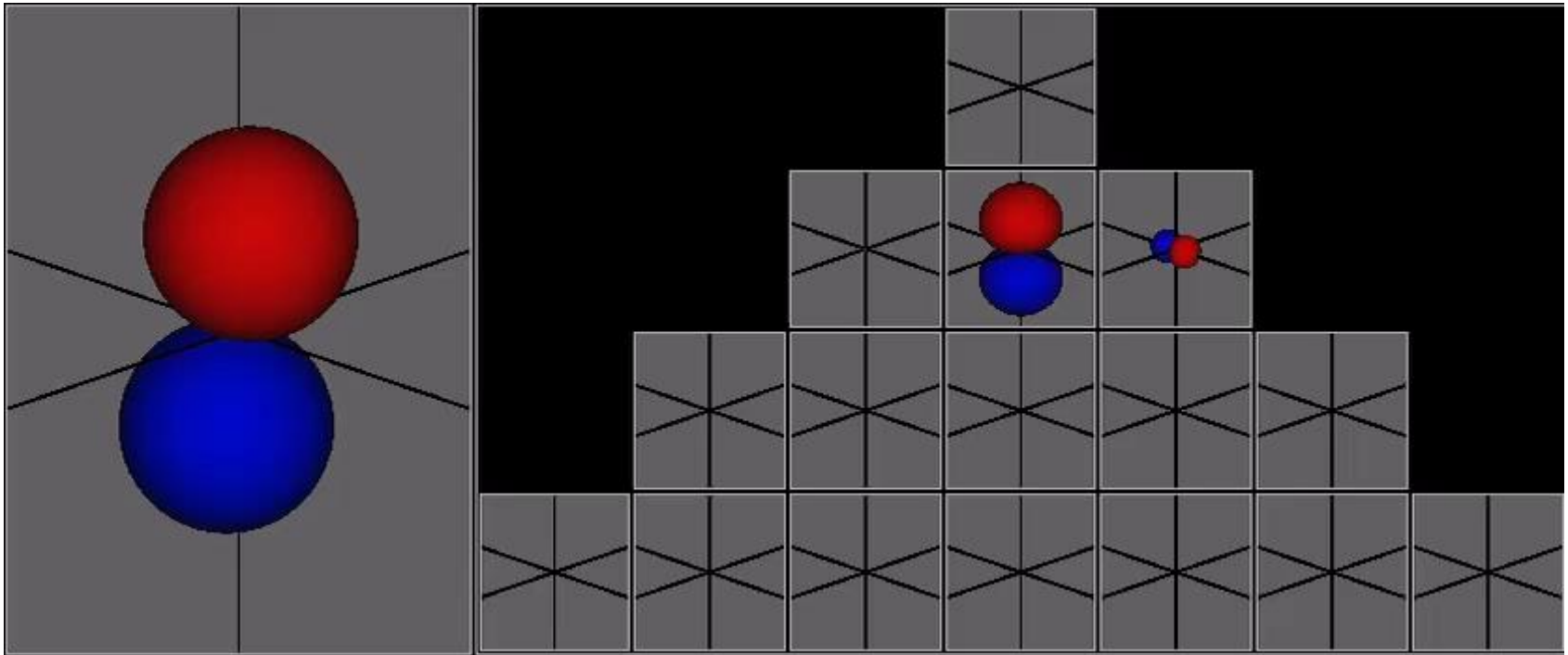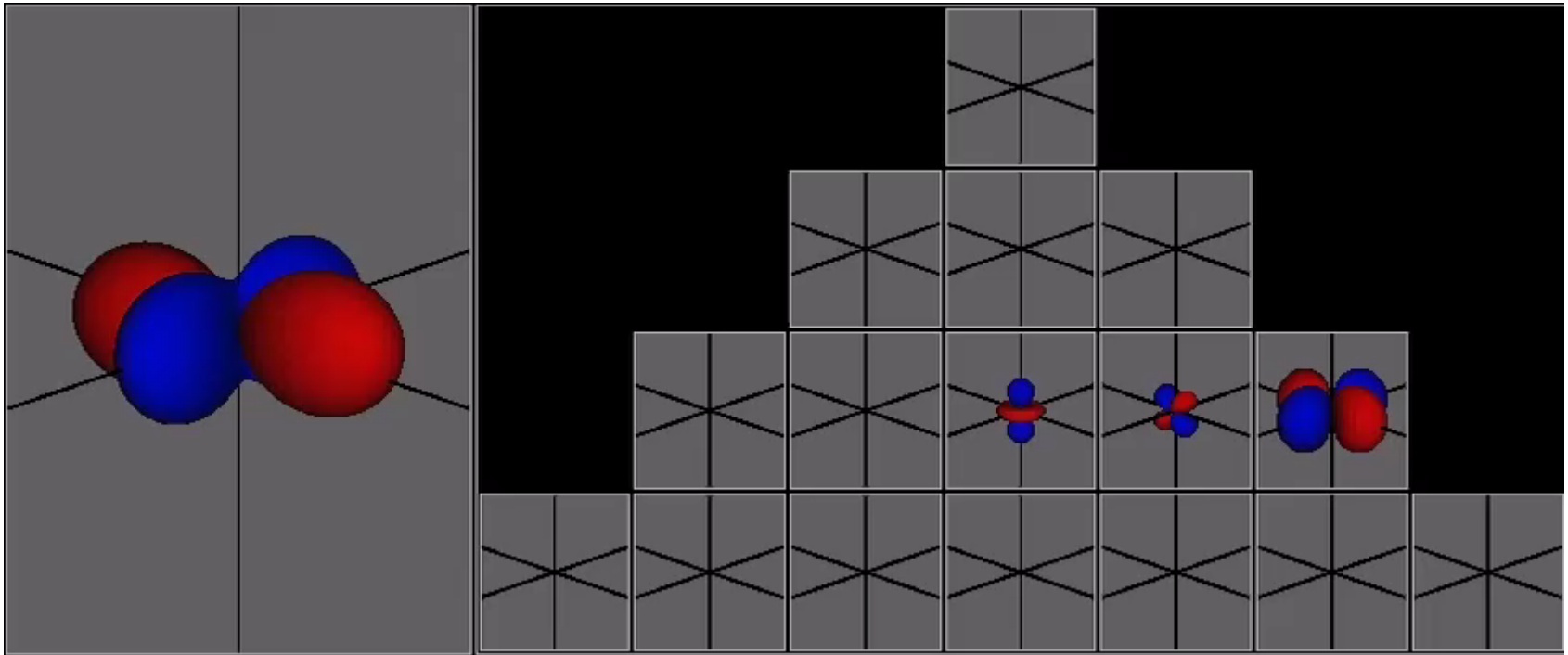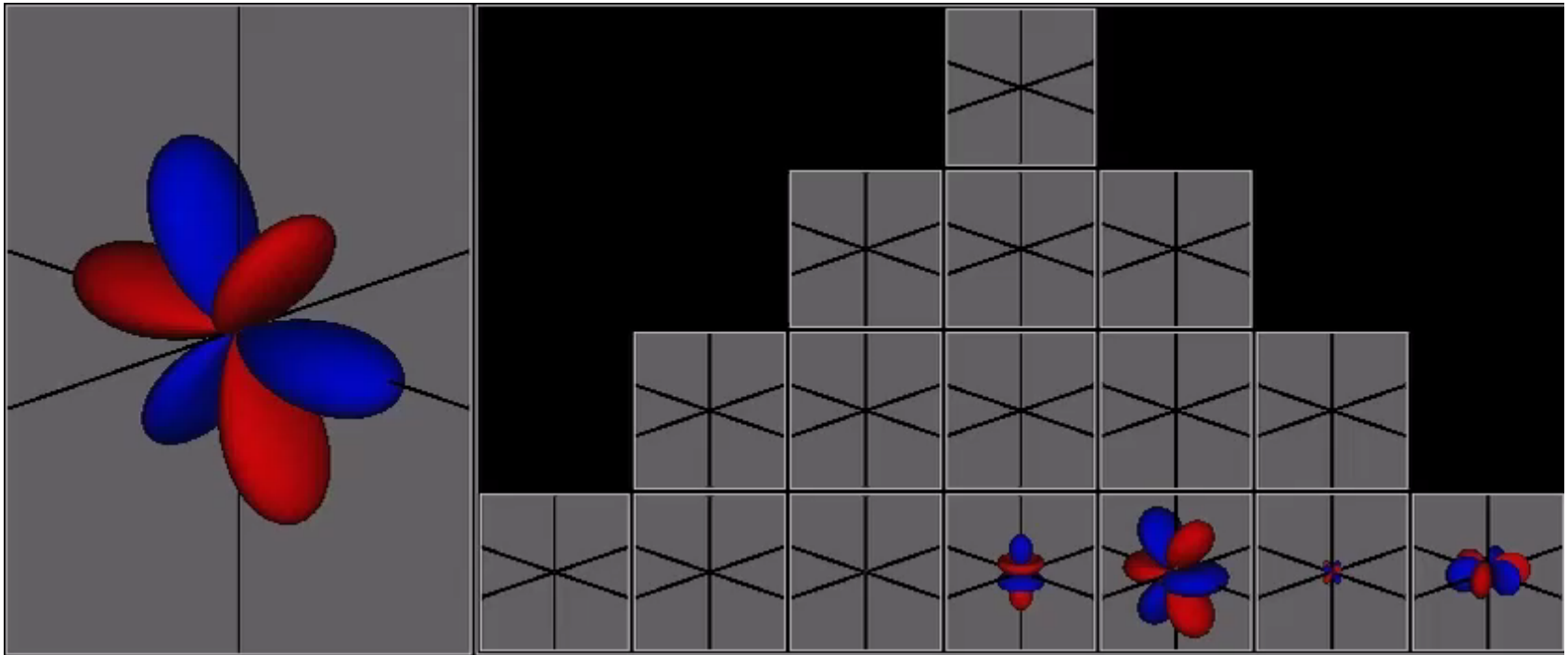
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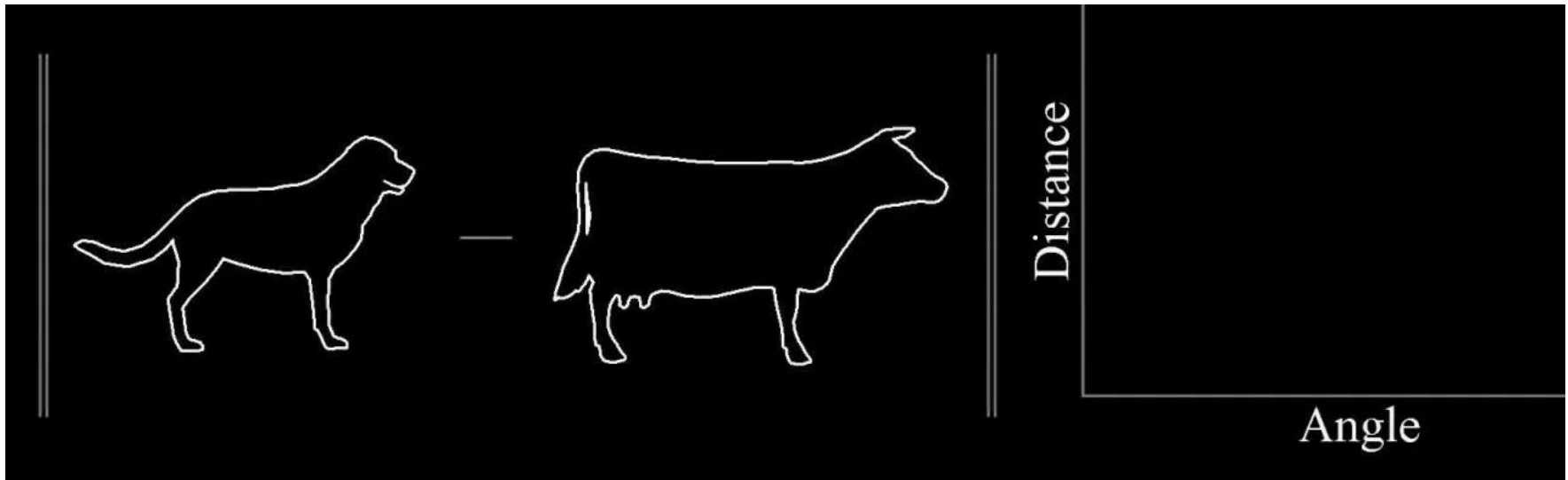- Representation Theory

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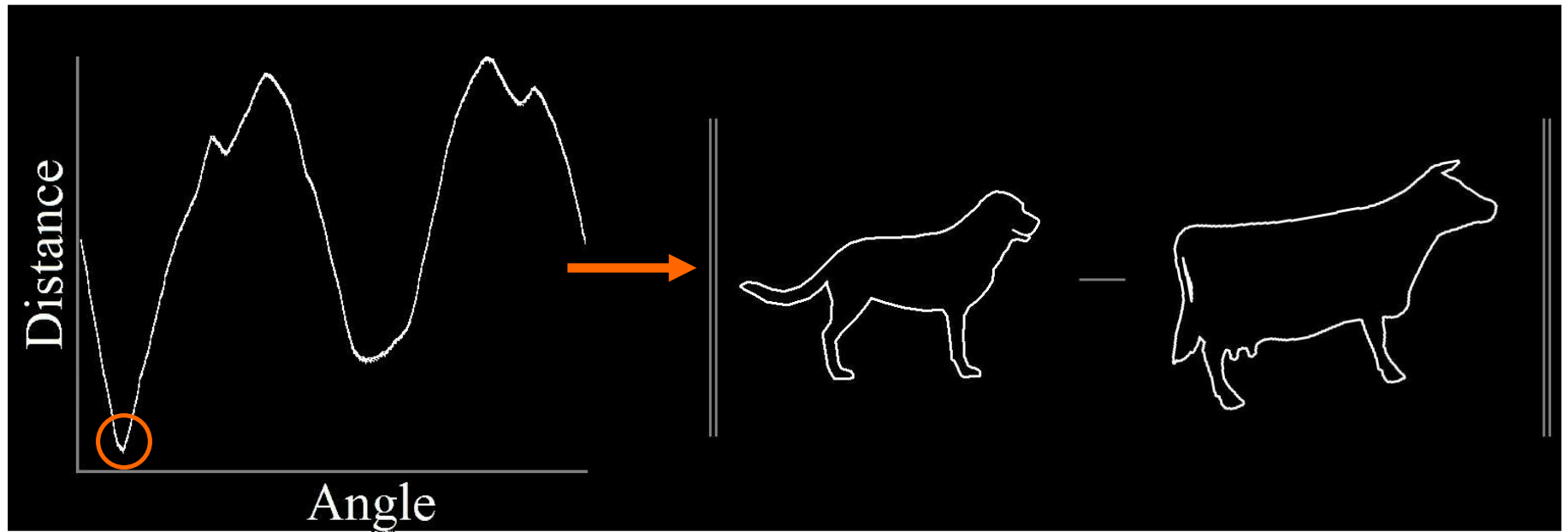# What are we studying?

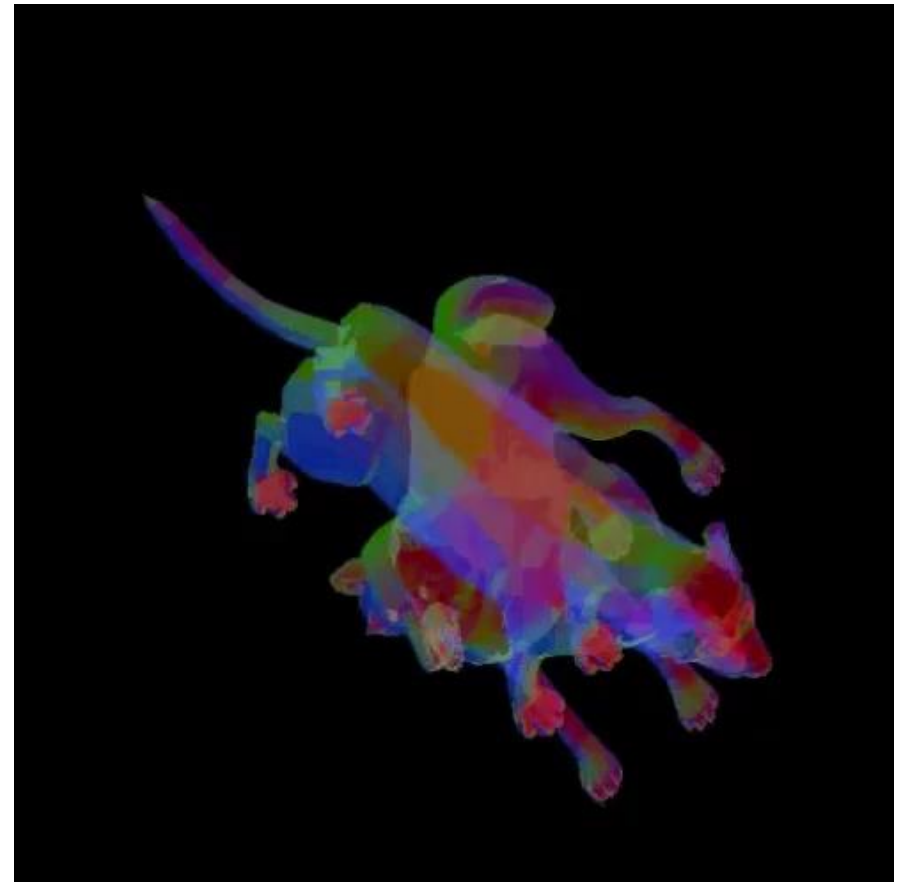- Signal Processing

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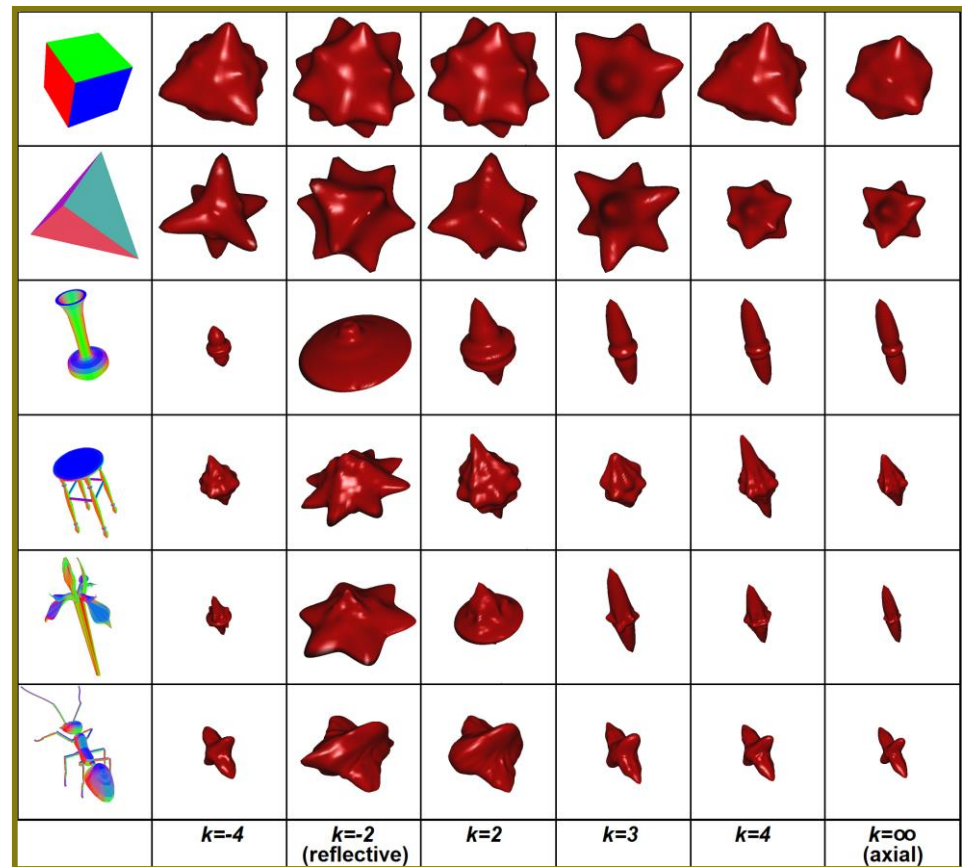
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- Symmetry Detection

| | k=-4 | k=-2 (reflective) | k=2 | k=3 | k=4 | k=∞ (axial) |

What We Will Cover

Some basic algebra
- Representation Theory
- Commutative Groups
  - » Schur's Lemma

Signals on a circle / torus
- Fourier Transform
- Convolution/Correlation
  - » Smoothing, Differentiation, etc.

Signals on a sphere
- Spherical Harmonic Transform
- Wigner-D Transform
- Convolution/Correlation
  - » Smoothing, Differentiation, etc.

What I Expect of You

Homework
> A code-base is provided. (Assignment 1 posted and due 2/20/19.)
> Assignments will focus on implementation.

~~Presentations~~

~~Exams~~

Readings
> There is no text book.
> Class notes will be posted.
> Supplementary readings will be suggested.

http://www.cs.jhu.edu/~misha/Spring19/