EMC Effect for A=3

Jason Bane

University of Tennessee

jbane1@vols.utk.edu

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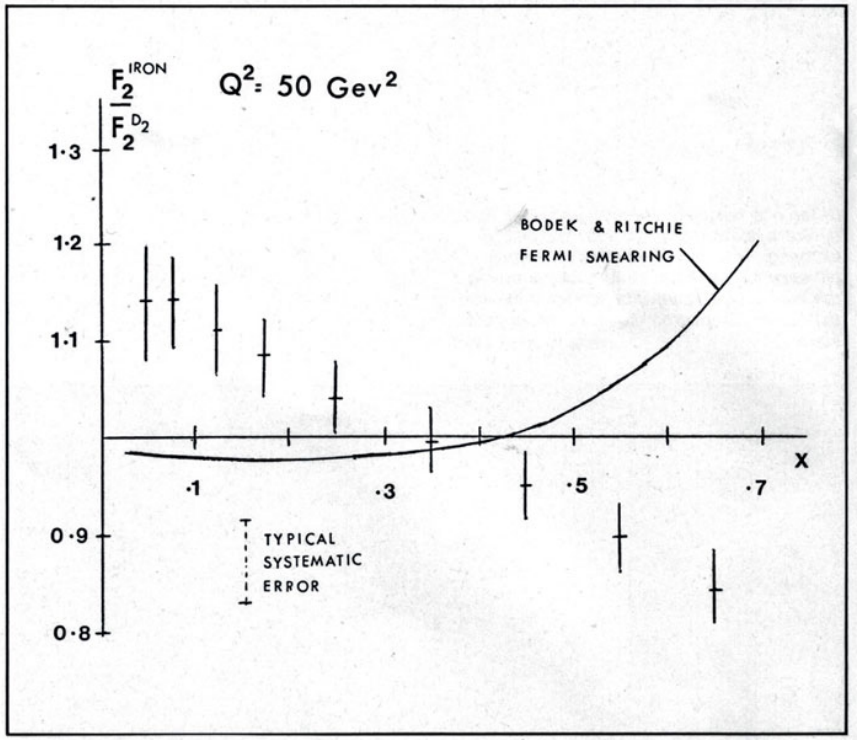
Outline

EMC Effect

European Muon Collaboration's (EMC) 1983 results for the Nuclear structure functions of Iron and Deuterium.

- Nucleon Structure Functions
- Sea-Quark Distributions
- Gluon Distributions
- Expected $F_A = NF_2^N + ZF_2^P$
- Because the binding energies of the nucleons are several orders of magnitude smaller then the momentum transfer for an interaction
- Fermi interaction causing differentiation at high momentum transfer.

Figure: EMC data of F_2^{Fe}/F_2^D from 1982 [Higinbotham D., 2013].



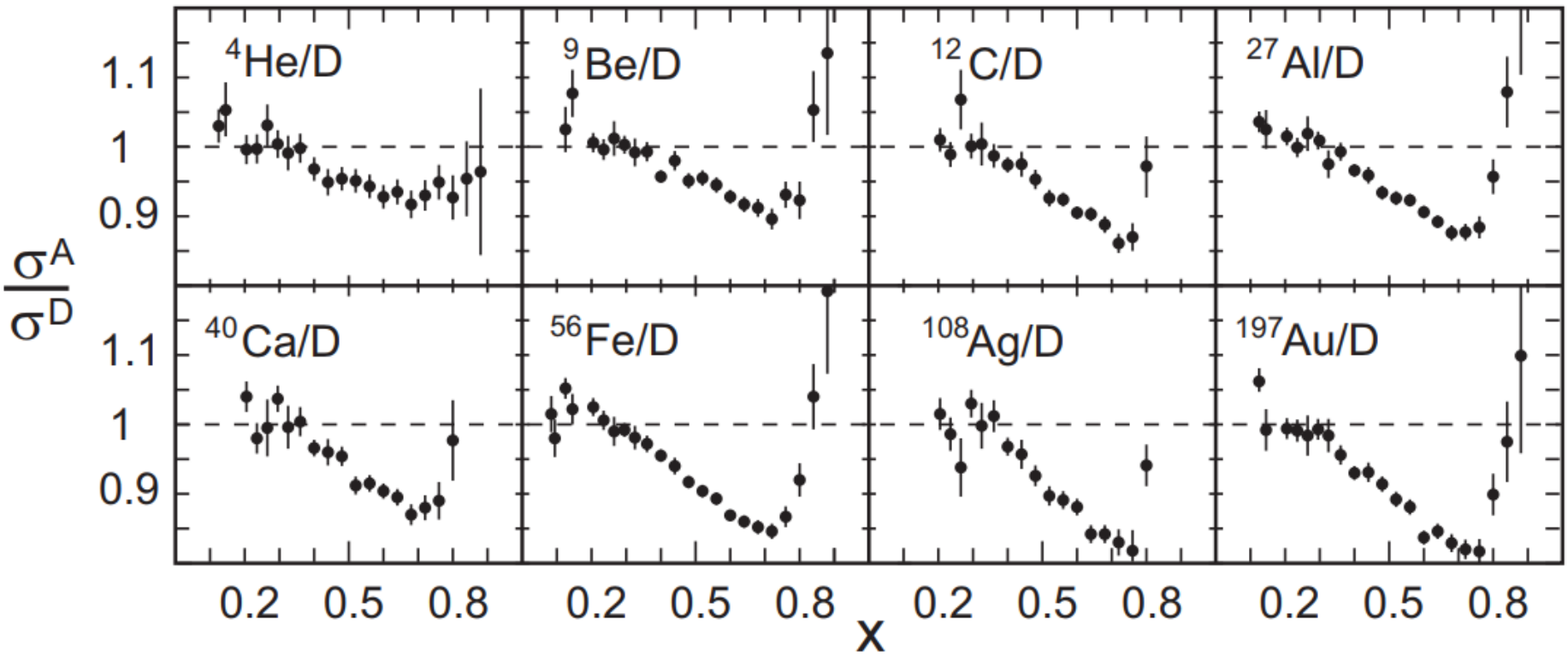
EMC Effect

European Muon Collaboration:

- Nuclear F2 structure function per nucleon different than that of deuterium
- Quark distribution functions modified in the nuclear medium
- Current Explanations
  - Binding effects beyond nucleon Fermi motion
  - Enhancement of pion field with increasing A
  - Influence of possible multi-quark clusters
  - Change in the quark confinement scale in nuclei
- No unique/universally accepted theory for explanation of effect up to date.

The EMC since

Figure: SLAC experiment E139 [J. Gomez et al., 1994].



The EMC since

Figure: JLab experiment "EMC in light Nuclei" [J.Seely, A. Daniel et al].

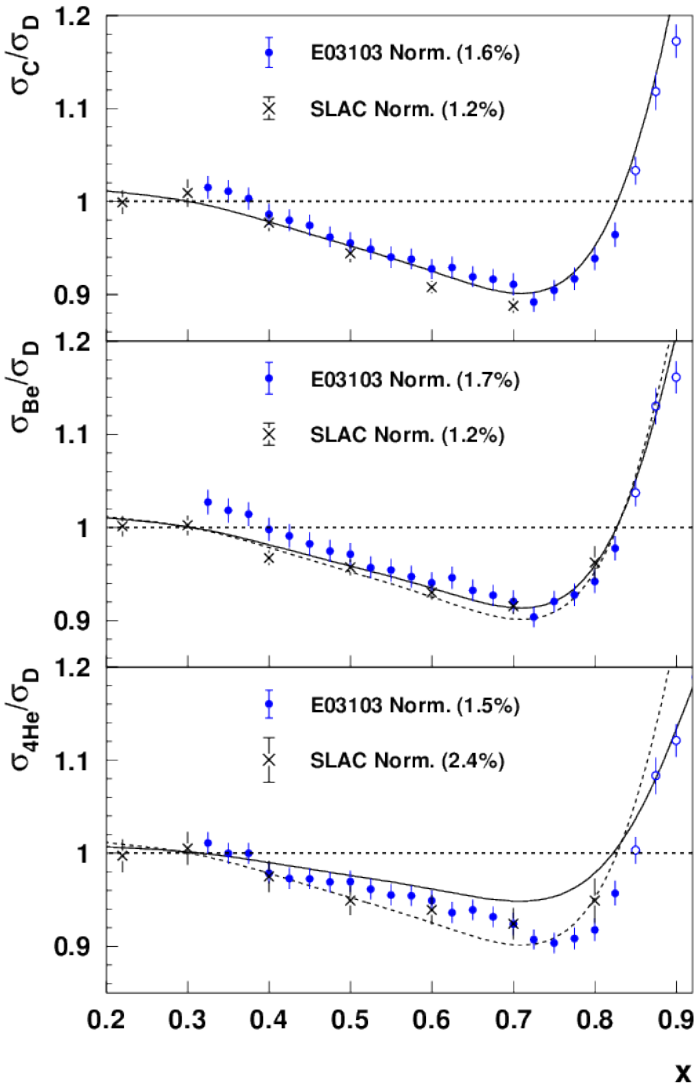
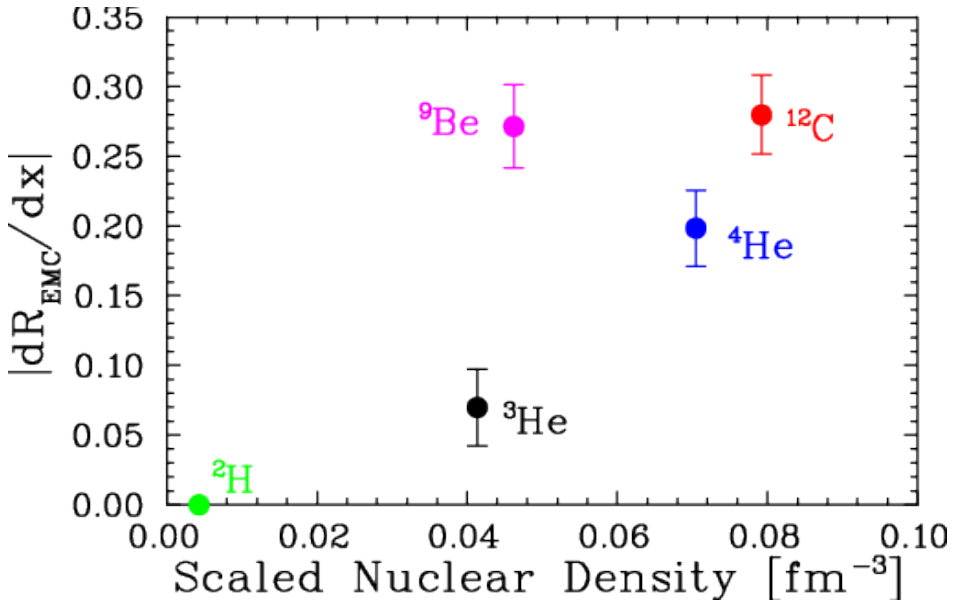
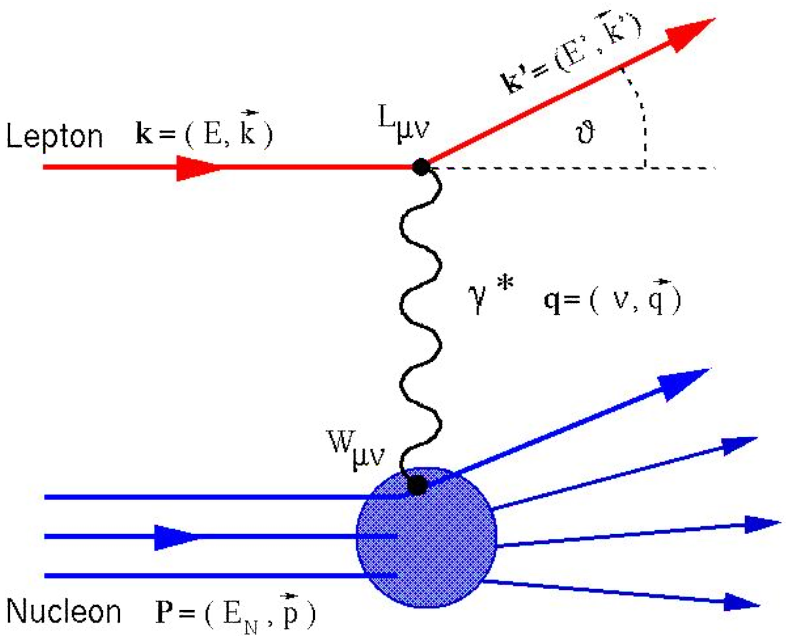


Figure: EMC as a function of Nuclear Density [J.Seely, A. Daniel et al].



Deep Inelastic Scattering



- Momentum Transfer
  $Q^2 \equiv 4EE'sin\frac{\theta}{2}$
- Bjorken X $(X_{bj}/x) = \frac{Q^2}{2\nu M}$
- $\sigma_{eN} = \frac{\alpha^2}{eE^2 sin^4(\frac{\theta}{2})}[\frac{F_2}{\nu}cos^2\frac{\theta}{2} + \frac{2F_2}{M}sin^2\frac{\theta}{2}]$

Bullet Points

- Lorem ipsum dolor sit amet, consectetur adipiscing elit
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- Nam cursus est eget velit posuere pellentesque
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Blocks of Highlighted Text

Block 1

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Multiple Columns

Heading

1. Statement
2. Explanation
3. Example

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Table

Treatments	**Response 1**	**Response 2**
Treatment 1	0.0003262	0.562
Treatment 2	0.0015681	0.910
Treatment 3	0.0009271	0.296

Table: Table caption

Theorem

Theorem (Mass–energy equivalence)

$E = mc^2$

Verbatim

Example (Theorem Slide Code)

```
\begin{frame}
\frametitle{Theorem}
\begin{theorem}[Mass--energy equivalence]
$E = mc^2$
\end{theorem}
\end{frame}
```

Figure

Uncomment the code on this slide to include your own image from the same directory as the template .TeX file.

Citation

An example of the `\cite` command to cite within the presentation:

This statement requires citation [Higinbotham D., 2013].

References

Douglas Higinbotham (2013)

The EMC effect still puzzles after 30 years

Cern Courier April 2013.

J. Gomez et al. (SLAC-E139)

Phys. Rev D 49 (1994) 4348

J.Seely, A. Daniel et al (2013)

New Measurements of the EMC Effect in Very Light Nuclei

nucl-ex/0904.4448.

The End